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THE JOURNAL OF INDUSTRIAL HYGIENE

AND ABSTRACT OF THE LITERATURE

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The Therapeutic Use and Toxicity of Picric Acid: With a Report of Two Toxic Cases

The Effect of Aniline Black Dyeing on Factory Workers

The Treatment of Constipation

Jet Dust Counting Apparatus

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ABSTRACT OF THE LITERATURE OF INDUSTRIAL HYGIENE

SUPPLEMENTARY TO

THE JOURNAL OF INDUSTRIAL HYGIENE

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DAVID L. EDSALL, M.D., S.D., United States
EDGAR L. COLLIS, M.D., M.R.C.S., Great Britain

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GENERAL

THE WORK OF THE INDUSTRIAL FATIGUE RESEARCH BOARD AND ITS APPLICATIONS TO INDUSTRY. *D. R. Wilson.* Jour. Roy. Soc. Arts, Nov. 18, 1921, 70, No. 3600, 3-20.—This paper presents a bird's eye view of the investigations which have been made in England by the government for the purpose of studying the human factor in industry. Mr. Wilson points out how precautions to protect the health and safety of workers have now been extended through attention to their physiological and psychological response to industrial environment. The methods followed have been the measurement of output, of morbidity and mortality, of labor turnover, of lost time, and of accident incidence. Output has proved the most valuable measurement so far, but the others have been closely studied. Results have been obtained which throw light upon optimum hours of work, upon impersonal factors in efficiency, such as temperature, ventilation and lighting, and upon personal factors, such as vocational selection and motion study. Excellent diagrams are reproduced showing hourly rates of charging blast furnaces, of output in silk weaving, and of innate diurnal rhythm; other diagrams exhibit variations in output throughout the week in different industries. The effect of seasonal changes, of lighting and of practice are also shown. Variations in output due to these different influences are shown to be far more than sufficient to make an industry prosperous or the reverse. The Board is now appealing to industries in their own interests to come forward and help in this work, the value of which has been so incontestably proved.

Mr. Wilson claims that the work of the Board is the first systematic attempt to ascertain facts; that it has a direct and important bearing on the increase of production; that it has laid bare facts deserving of immediate attention; and that already the results are bearing fruits. Those unacquainted with the work of the Board will find this article of great value.—E. L. Collis.

VOCATIONAL GUIDANCE (A REVIEW OF THE LITERATURE). *B. Muscio.* Indust. Fatigue Research Board, Report No. 12. His Majesty's Stationery Office, London, 1921, pp. 57.—Among the factors affecting human efficiency in industry, perhaps one of the most important is some method of ensuring that, so far as practicable, every worker shall be placed *ab initio* in an occupation for which he is naturally fitted. The high labor turnover commonly occurring among beginners employed in factories tends to show that the initial selection of an occupation is often a matter of chance, and that any permanent employment subsequently obtained is only secured after a process of trial and error. Apart from other considerations, there can be nothing more discouraging than the realization that a long period of training has only been partly effective and that the time so spent might have been used more profitably in another sphere.

The recognition of these facts has led to the development in recent years of the methods known as vocational guidance. Vocational guidance may be defined as a policy that attempts, on a scientific basis, to guide each individual into an occupation for which his psychophysiological constitution fits him, and is to be distinguished from vocational selection. The former results from asking: For what occupation is this or that individual best fitted? The latter results from asking: Is this or that individual fitted for this particular occupation? The former question places at least as much emphasis on the needs of the individual as on the needs of industry; the latter emphasizes the need of a particular industry.

It has been urged in favor of vocational guidance that adaptation of the worker to his work on the basis of natural fitness may be expected *(a)* to effect a decrease of industrial fatigue; *(b)* to bring about an increase in output; *(c)* to produce a situation in which the worker finds more interest in his work; *(d)* to reduce labor turnover; and *(e)* to reduce the number of industrial accidents, partly by lessening labor turnover, and partly by guiding those who are naturally likely to have accidents into occupations in which accidents are impossible.

Methods in Vocational Investigations.—The currently accepted method for determining the psychophysiological capacities required in a given occupation is as follows: Groups of persons engaged in the occupation and representing different grades of efficiency are given a number of tests, the results of which are compared with work records by the method of correlation. Probably the chief difficulty to be overcome in carrying out this procedure is that of obtaining a reliable efficiency grading for the occupation.

The choice of the tests to be used in any given case has been guided by a variety of considerations. The different procedures by which the desired information may be obtained have been classified as follows: *(a)* The experimenter may use sample tests: that is, standardized samples of the actual work may be used as tests. *(b)* He may use analogous tests: here the test is no part of the actual work but is modelled on it and is similar to it. *(c)* He may first observe the occupation and analyze it into its psychophysiological or neuromuscular elements, and then give standard tests for each of these elements. *(d)* Or, finally, a very empirical method may be used: the experimenter may give a number of tests chosen at random and simply accept as good tests those which yield large correlation coefficients with efficiency in the occupation. In practice, this fourth procedure is usually more or less similar to the third, since practical reasons always demand some limitation of the number of tests used.

It has sometimes been urged that vocational aptitudes are determined not so much by the possession or lack of special mental or physiological capacity as by general emotional and temperamental qualities. A few attempts have been made to determine whether *interests* could be made the basis of vocational guidance. The results obtained by different investigators, however, are very conflicting. There is the difficulty of estimating the intensity of an interest, the psychological facts of competing

interests, the relatively fleeting character of many interests, and the fact that many occupations excite little or no interest. When it is added that the relation of interest to capacity is ambiguous, and that a youth's interests are often a consequence of insufficient knowledge about occupations, it seems clear that little use can be made of interest by vocational guidance. It is generally recognized, however, that temperamental factors are very important, and their relation to different occupations is urgently in need of investigation.

Special Investigations.—Detailed accounts are given of all the past investigations that have been carried out on vocational guidance. The occupations studied include clerical work, engineering and metallurgical work, music, printing, salesmanship, telegraphy, telephone operation, transport work, and a few miscellaneous occupations.

Future Investigations.—While the investigations reviewed suggest that a scientific vocational guidance policy is certainly possible, it is difficult to assess the value of many of the results. The investigations not infrequently give the impression of somewhat rough and ready attempts to solve practical problems; and there is sometimes about them an air of accidentalism both as regards the person upon whom tests were made and also as regards the tests that have been used. Different investigators, attempting to discover the capacities required for the same occupation, have sometimes obtained significant positive correlation coefficients with very different tests. In such instances, the conclusions of the investigators are probably individually one-sided and need to be combined.

What seems necessary now is a far more systematic and sustained investigation into the capacities required for different occupations than has hitherto been attempted. If a sound basis is to be obtained for vocational guidance, occasional investigations of the type reviewed, the possibility of which depends upon the willingness of a few employers and groups of workers to co-operate with the scientific investigator, while suggestive and useful up to a certain point, are insufficient.

A more adequate method of investigation suggests itself. Large numbers of young persons who are about to enter industry might receive a thorough psychophysiological examination. As far as possible, they should be re-examined annually for several years, first to guard against errors, always possible in a single examination, and, secondly, to determine what changes, if any, are produced in the ability to carry out different tests by working at different occupations. During a period of from seven to ten years, an exact record should be kept of the industrial history of those who are examined, and their success or failure in different occupations should be correlated with their psychophysiological constitution. Within a decade an investigation of this nature, if carried out systematically and extensively, should lay a satisfactory scientific foundation for a national vocational guidance policy.

The points to be emphasized concern: (1) the exact nature of the problems to be investigated; and (2) the method of investigation.

In view of the investigations above reviewed, the *problems* may be stated as follows: *(a)* to determine the *general intelligence* level required by each occupation; *(b)* to determine the *special* capacities (including physiological characteristics) required by each occupation; *(c)* to determine the relation of *temperamental* qualities to efficiency in different occupations.

Concerning general *methods,* it is suggested: *(d)* that investigations similar in type to those reviewed should be carried out in as large a variety of occupations as possible; *(e)* that, in addition, extensive investigations, to be continued over a number of years, should be inaugurated, for the purpose of making psychophysiological measurements of young persons in different occupations and of comparing such measurements with occupational records.

The report concludes with a valuable bibliography of English and foreign literature dealing with the subject.—D. R. Wilson.

Report of the Division of Industrial Safety. Reprinted from Ann. Rep. Mass. State Dept. Labor and Industries, Boston, 1921, pp. 83.—The work of the former Board of Labor and Industries is continued in the Division of Industrial Safety of the new Department of Labor created under chapter 350 of the General Acts of 1919. The duties of the Division include the administration of the laws regarding the employment of women and minors; regulating

labor on public works; providing for the adequate lighting, ventilating and sanitation of industrial establishments; providing for the guarding of dangerous machinery; regulating tenement-house work; and the administration of such general labor laws as those regarding one day's rest in seven, the weekly payment of wages and advertising for employees during strikes.

The report gives in detail an account of the work of inspection, the number of visits, and the testing of the "block system;" and there are sections on hours of employment for women and minors, industrial safety, building trades, new rules for woodworking machinery, safeguarding of machinery by manufacturers, hoods for grinding wheels, industrial health, occupational diseases (lead poisoning, anthrax, dermatitis, poisoning by gas and fumes), courses in industrial hygiene at Harvard Medical School, special investigations, health hazards in the granite-cutting industry, health of women and minors in laundries, accident prevention, the transportation industry, licenses for home work, hours for public employees, and weekly payment of wages. An appendix of about forty-five pages contains a tabulated report of home permits, employment certificates and educational certificates issued during 1920.

Many facts of general interest from the point of view of industrial hygiene may be gleaned from the report:

During the year about 4,000 orders dealing with hazards found in the various industries were issued. The "significance of these figures is more fully realized when it is understood that in a large manufacturing establishment the issuance of a single order frequently results in removing many hazards."

There were more than 3,000 tabulatable accidents in the building trades of the state in the year ending June 30, 1919, and now four inspectors are giving their time to securing compliance with rules and regulations for the prevention of accidents in building operations. The regulations require firms engaged in painting to register with the Department, and much has been done to prevent the use of bad stagings.

Accidents of the most serious kind occur in the use of grinding wheels covered with cast-iron hoods. A cast-iron hood will not hold parts of broken wheels. Steel hoods prevent accidents. A grinding wheel safety code is now in process of preparation, and some tentative rules are reported. It is advised that hoods be mounted so as to maintain alignment with wheels, the fastenings to have ample strength to minimize displacement in case of wheel breakage.

It is said that despite work done in regard to first-aid equipment, infection from minor injuries seems to be on the increase, and the statistics show that during the year there were 5,603 cases of infection, eighteen fatal, and twenty-seven causing permanent partial disability. The principle of first-aid treatment is not successful without the real co-operation of the employees.

During the year, eighteen cases of anthrax have been reported and have been investigated. Usually in plants where there is danger of infection, good first-aid rooms are provided and foremen are instructed to report all cases of cuts, bruises or abrasions of the skin and to require employees to report for medical treatment.

Fifty cases of lead poisoning have been investigated. Attention is called to the hazard of scouring automobile bodies with sandpaper after the priming coat has been applied, and to the possibility of absorption of lead through the skin in some kinds of work.

"New conditions in the industrial world have contributed to make fume and gas poisoning a serious problem in connection with the general health of employees in certain types of establishments." The manufacture of dyes, coal tar products and benzene is often carried on without much protection. Suitable exhausts, and provision of sanitary and washing facilities are necessary.

Special investigation was made of the effect of different processes in the manufacture of tobacco upon the health of employees. The effect upon beginners and upon minors, the danger of tuberculosis and other respiratory diseases, occupational neuroses, dermatitis, toxic amblyopia, and the general effect on the health of women, especially with regard to the genital system, were considered.

The health hazards in the granite-cutting industry were also given especial attention. The introduction of compressed-air surfacing machinery with the use of pneumatic tools has increased the hazards in this industry by generating a powdery dust which is easily inhaled. In the finer work the face is brought close to the point of operation, thus increasing the risk. Portable exhaust systems can be made to remove the dust.

The wet wash laundry, the latest development in this industry, is usually carried on under bad conditions, with crowding of machinery and inadequate provision for the disposing of waste water and steam.

More fatal accidents take place among employees in the transportation industry than in any other. Of a total of 376 fatal accidents in the state during the year, 102 were in this industry.—G. E. Partridge.

SYSTEMIC OCCUPATIONAL DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

EXPERIMENTAL TAR CANCER. *B. Bloch* and *W. Dreifuss.* Abstracted as follows from Schweiz. med. Wchnschr., Nov. 10, 1921, 51, No. 45, 1033, in Jour. Am. Med. Assn., Jan. 14, 1922, 78, No. 2, 152.—"Bloch and Dreifuss were conducting research in this line in 1912, and resumed it in 1920. They experimented with rabbits, guinea-pigs and white mice. Their results with rabbits were like those published by the Japanese investigators in this line, but the cancers induced in white mice surpassed them in every respect. Guinea-pigs have proved refractory to date. The special feature of their research is that they experimented with the different elements of the coal tar, as well as the whole tar, painting the back of the white mouse with the substance daily for 160 days or more. The tumors continue to grow in diameter and depth after the applications have been suspended, and metastatic tumors were found in axillary and inguinal glands and in the lungs. They found up to 20 metastatic nodules in one lung, and this lung metastasis was evident in 30 to 40 per cent. of the mice that lived long enough. Their experiments with the different elements of the tar demonstrated, they say, that the cancer-inducing fraction is a substance with a boiling point of over 300° C. freed from the bases, phenols, etc., that boil at a low temperature. It is effectual even after distillation, inducing in four months in 100 per cent. extensive and rapidly growing malignant tumors. The work was done at the dermatologic clinic at Zurich of which Bloch is chief."—C. K. Drinker.

CENTRAL NERVOUS SYSTEM

THE NEUROSES AND THE INDUSTRIAL COMMISSION. *Lewis J. Pollock.* Nation's Health, Jan. 15, 1922, 4, No. 1, 40-42.—In this paper the author discusses at some length the traumatic hysteria which frequently results from an industrial accident. Hysteria following injury may be due to several causes: "(1) fear of being severely injured, unable to resume occupation and support of family with ensuing desire for pension; (2) resentment and desire for compensation, and rarely for causes not associated with either of these two, such as would have produced hysteria had any other 'accident' than injury occurred.

"Is it meant by this that these patients are faking, putting this on, that they hypothecate their illness? It is not. They suffer just as much as if they were disabled from organic causes. Is the condition imagined? It is not. . . . The symptoms are real enough, but they occur only because of suggestion, not because of injury or shock. Usually the patient is injured or is in an accident, he experiences some pain or slight disability, he is fearful lest it be serious, he becomes introspective, attentive to himself, sensations which formerly he would dismiss are now indicative of serious ailment. His friends ask him innumerable questions with entailing suggestions. An enforced period of idleness occurs. He is examined by physicians, who, by injudicious questions, suggest new symptoms. He is fearful lest he be unable to resume his occupation and support his family. Here in short is a well prepared

field for the development of severe signs of hysteria. He seeks compensation and legal advice and forthwith a hysteria develops. It does not occur immediately after accident, it occurs following a latent period during which time suggestion has had an opportunity to act.''

Such a man is not a malingerer. Malingering is a ''wilful imitation of disease for the purpose of gain. . . . Although back of both conditions there is an illicit motive, the hysterical patient is not aware of it.''

What relation does compensation bear to hysteria? ''It is the opinion of contemporary neurologists that were it not for possibility of compensation the traumatic neuroses would practically not exist.

''Litigation holds out promise of reward and fosters the neuroses. Prolonged litigation prolongs the duration of a neurosis and prolonged forms of compensation work to the same end. . . . As soon as it is recognized that immediate final settlement cures a hysteria, it will be found that the amount of expense, otherwise prolonged, will be reduced. The quicker the patient recovers, whatever the initial cost, the less, in my opinion, will be the expense. Certainly an early and final settlement is the only just procedure for such a case. In addition to this several essential features in the handling of such a case stand out; an early and correct diagnosis by competent observers, avoidance of careless examinations and ignorant diagnoses, a quick return to some form of work, and avoidance of prolonged litigation and its ensuing chances for suggestions and fixation, particularly when the patient is an observer of the trial of his case.''—Katherine R. Drinker.

MENTAL

HYGIENE OF THE MIND. *L. Bianchi.* Abstracted as follows from Riforma Med., Dec. 3, 1921, 37, No. 49, 1141, in Jour. Am. Med. Assn., Feb. 11, 1922, 78, No. 6, 474.—''In this opening lecture of the course on nervous and mental diseases, Bianchi emphasized among other things the stabilizing effect of work on the mind, and deplored the prevailing conception that the fewer hours we have to work the better off we are. 'This is the view which politicians and labor leaders—to promote their own selfish interests—are impressing on the public. The result is that the shortening of the hours of labor, instead of giving leisure for home duties and family life, is deteriorating character and mental health as the free hours are devoted to loafing. Work—the great stabilizer of the nervous system—is abhorred and shirked more and more—a sad perversion of the ideal aimed at in the early agitation for the eight hour day.' Nervous disease is becoming more and more prevalent, and the number of the insane has trebled in the last twenty years. Physicians should be on the lookout for anomalies in character as well as in the blood or tissues. He says that his forty years of practice have demonstrated that anomalies in character in children can be effectually combated by wise management and hygiene, either in the home or with some wise and patient teacher. Those children that failed to get this favorable environment or were sent to a large school where all were treated alike, had their abnormal traits intensified, and grew up to be candidates for the reform school or asylum.''—C. K. Drinker.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

GAS MASKS FOR GASES MET IN FIGHTING FIRES. *A. C. Fieldner, S. H. Katz,* and *S. P. Kinney.* U. S. Bur. Mines, Tech. Paper 248, Aug., 1921, pp. 61.—This report, which is well supported by a bibliography and a very complete index, sets forth in simple technical and non-technical language the advantages and disadvantages, under very definite conditions, of a modified type of United States Army gas mask for use in fighting fires of various origins.

It is pointed out that of the combustion products of explosives and fuels, both liquid and solid, carbon monoxide is the most dangerous and is not absorbed by the present type of army gas mask. A new mask and absorbent now being devised will, it is believed, be effective against this gas, as well as against

the other gases usually encountered in fighting fires. From a physiological standpoint carbon monoxide and the oxides of nitrogen are the most dangerous and consequently the most important gases to the fire fighter. The safest means at present of obviating the effects of these two gases is by the use of oxygen or air breathing apparatus, although this is cumbersome and not popular with firemen.

The present army gas mask effectively absorbs the following products resulting from the heating of carbon tetrachloride when used as a fire extinguisher: chlorine, sulphur dioxide, vapors of ammonia, acetone, alcohols, aniline, chloroform, ether, toluene, benzene, carbon disulphide, carbon tetrachloride, formaldehyde, turpentine, phosgene and hydrochloric acid gas. Carbon monoxide, illuminating gas as containing physiologically dangerous percentages of carbon monoxide, nitrogen oxides, gasoline and petroleum vapors are best obviated by the use of oxygen respirators, or gas masks to which a source of pure air is connected by non-collapsible rubber tubing.

Several types of gas masks and of air and oxygen breathing apparatus are described and illustrated. The preparation of absorbents for cannisters is dealt with and their respective limitations pointed out. Highly activated charcoal, soda lime, silica-gel as an ammonia absorbent, as well as salt hydrates of copper, cobalt and nickel with silica-gel, are described in detail.

Experiments with incompletely burned fires in closed spaces are tabulated, with analyses of the gases resulting. Specifications for fire fighters' masks are appended, with a table of thirty-six gases most commonly encountered in fire fighting, and a list of Bureau of Mines publications relating to this general subject.—Philip Drinker.

THE CATALYTIC OXIDATION OF CARBON MONOXIDE. *T. H. Rogers, C. S. Piggot, W. H. Bahlke,* and *J. M. Jennings.* Jour. Am. Chem. Soc., Sept., 1921, 43, No. 9, 1973-1982.—This research was undertaken for the Chemical Warfare Service for the purpose of providing a gas mask ingredient which would be a suitable oxidizing agent against carbon monoxide. The most satisfactory mixture was found to be manganese dioxide with silver or copper oxide, or both. Water vapor was found to exert an appreciable effect on the life of the catalysts.

Persons interested in the subject of industrial respirators are referred to the reviews of articles by Levy and West, and Desgrez, Guillemard, Hemmerdinger and Labat, which appeared on pages 247 and 248 of the abstract section of the March issue of THIS JOURNAL.—Philip Drinker.

THE CATALYTIC OXIDATION OF CARBON MONOXIDE AT ORDINARY TEMPERATURES. *D. J. Merrill* and *C. S. Scalione.* Jour. Am. Chem. Soc., Sept., 1921, 43, No. 9, 1982-2002.—This is a report of a Chemical Warfare Service investigation on the development of a suitable catalytic mixture for use as an oxidizing agent for carbon monoxide. The authors found the two most satisfactory mixtures to be manganese dioxide and basic copper carbonate, and manganese dioxide, copper oxide, cobaltic oxide, and silver oxide, respectively. The use of a drying agent, such as calcium chloride, is pointed out, and the various factors influencing the activity of the catalysts are discussed.—Philip Drinker.

CARBON MONOXID POISONING. *H. Günther.* Abstracted as follows from Ztschr. f. klin. Med., Nov. 15, 1921, 92, No. 1-3, 41, in Jour. Am. Med. Assn., Feb. 4, 1922, 78, No. 5, 396. —"Günther found evidence of polyneuritis from illuminating gas poisoning in about 1 per cent. of the 215 cases at the Leipzig medical clinic in the last thirty years. Hemorrhagic polymyositis was noted in three cases, accompanied by elimination of a peculiar pigment in the urine in the one fatal case." —C. K. Drinker.

METHANE IN CALIFORNIA GOLD MINES. *B. O. Pickard* and *E. D. Gardner.* U. S. Bur. Mines, Reports of Investigations, Serial No. 2303, Dec., 1921.—The authors describe the occurrence of methane in certain California gold mines, the geology of its formation, and its detection and properties. They refer to eleven Bureau of Mines' circulars relating to this gas.—Philip Drinker.

THE DETERMINATION OF OXIDES OF NITROGEN. *V. C. Allison, W.L. Parker,* and *G. W. Jones.* U. S. Bur. Mines, Tech. Paper 249, Sept., 1921, pp. 13.—This pamphlet discusses the physiological effects of oxides of nitrogen, the sampling of gases containing these oxides,

and their quantitative determination by the di-phenyl sulphonic acid method. It is pointed out that there is no advantage in determining nitric and nitrous oxides separately, since the former is ultimately oxidized to nitrogen peroxide in the presence of oxygen and then forms nitrous and nitric acids in the presence of water vapor. The authors claim that 10 parts of oxides of nitrogen as nitrate could be detected in 1,000,000 parts of the air oxides of nitrogen mixture, with an accuracy of 5 or 6 parts per million.—Philip Drinker.

Blood in Tetrachlorethane Poisoning. *G. R. Minot* and *L. W. Smith.* Abstracted as follows from Arch. Int. Med., Dec., 1921, 28, No. 6, 687, in Jour. Am. Med. Assn., Jan. 14, 1922, 78, No. 2, 146.—"A study by Minot and Smith of the blood of sixty-eight persons exposed to a greater or lesser degree to tetrachlorethane, indicates that blood examination is of value in the prevention of tetrachlorethane poisoning and in the diagnosis and prognosis of poisoning by this substance. The blood changes usually can be observed before clinical symptoms develop. The blood abnormalities include *(a)* a progressive increase of large mononuclear cells, often reaching 40 per cent. This is the most important change. *(b)* The appearance of many immature large mononuclears. *(c)* A slight elevation in the white count. *(d)* A progressive but slight anemia. *(e)* A slight increase in the number of platelets. A percentage of large mononuclear white cells above 12 is the first sign of a reaction to tetrachlorethane, and is a signal for close observation of that person. The presence of a considerable number of young large mononuclear cells, some formed and many broken, is to be considered as indicating a severer condition than when the same number of more mature large mononuclears are present."—C. K. Drinker.

Experimental Poisoning with Picric Acid. *Candela* and *Amelio.* Il Lavoro, Nov. 30, 1921, 12, No. 7, 213-214.—In certain animals, for example guinea-pigs, it is impossible to produce icterus by administering picric acid, although there is a marked toxic effect. In others, such as dogs, striking icterus is produced which is hematogenous in nature. Applying these results to picric acid poisoning in man, it can be seen that they throw doubt on the theory that the yellow tint of the skin is to be attributed solely to the affinity of picric acid for the cells of the cutis. Examination of the urine shows only traces of urobilin and biliary pigments as is usually true in hemolytic jaundice in man, which fact seems to point to the conclusion that in man, as in dogs, the jaundice of picric acid poisoning is a hemolytic jaundice. In cases of icterus of this character it is important to remember that the individual may have a predisposition to erythrocytic fragility which is perhaps not as infrequent as has been supposed.—Alice Hamilton.

Treatment of Acute Phosphorus Poisoning. *H. V. Atkinson.* Abstracted as follows from Jour. Lab. and Clin. Med., Dec., 1921, 7, No. 3, 148, in Jour. Am. Med. Assn., Jan. 21, 1922, 78, No. 3, 244.—"Atkinson asserts that liquid petrolatum given one hour after taking phosphorus furnishes complete protection against the onset of harmful symptoms. Liquid petrolatum is physiologically inert and acts entirely by reason of its physical properties. Its use is recommended in the treatment of phosphorus poisoning. Since liquid petrolatum is a harmless and non-irritating cathartic, it may be used to delay absorption from the intestine in many, perhaps all, cases of poisoning."—C. K. Drinker.

DUST HAZARDS AND THEIR EFFECTS

Automatic Filter for the Measurement of Suspended Impurity in the Air. *J. S. Owens.* Jour. Roy. San. Inst., Jan., 1922, 42, No. 4, 265-268.—Dr. Owens describes an automatic filter which he has designed for the measurement of suspended impurity in the air. The apparatus is essentially an automatic aspirator by means of which, at regular intervals of time, which may be varied in length at will, a fixed volume of air is drawn through a filtering paper of sufficiently fine texture to collect on its sur-

face the whole of the dirt in the air in the form of a discolored patch which can be interpreted later. This is combined with a clock-work arrangement for moving the paper after each record is taken, so that a fresh filtering area is brought into position for the next record, and the time of each record is registered. The filter paper, which is in the form of a disk and is separated into twenty-four hourly divisions, rotates with the clock. At regular intervals air is drawn through a patch of the paper. In action the volume of air drawn through the paper at each operation is exactly two liters at atmospheric pressure—a volume which has been found quite convenient. Each record is interpreted by comparing the blackness with a standard scale of shades calibrated by comparison with larger paper filter records, the deposit on which has been actually weighed. The scale of shades consists of squares numbered from 1 to 20, of even gradation of shade from white to nearly black. The matching presents little difficulty and results can be expressed in absolute units, each shade having been found to represent 0.32 mg. of dirt per cubic meter, which is equivalent to 0.54 pounds per million cubic yards. The only attention which the instrument requires is the changing of the paper disk once every twenty-four hours, and the daily winding of the clock.—E. L. Collis.

PNEUMONOCONIOSIS AND ASTHMA IN SAW MILL WORKMEN. *K. Gade.* Abstracted as follows from München. med. Wchnschr., Sept. 9, 1921, 68, No. 36, 1144, in Jour. Am. Med. Assn., Jan. 7, 1922, 78, No. 1, 76.—"Gade states that, while pneumonoconiosis resulting from the inspiration of coal, metal, and mineral dust, and of vegetable material, in the form of flour and tobacco dust, has received widespread consideration in the literature, little has been said about analogous diseases resulting from breathing in the dust of wood fiber in saw mills, planing mills and similar industries. Under the microscope, the wood particles in the air are found to have many sharp edges and points. Under habitual inhalation of wood-fiber particles they set up a catarrhal affection of the respiratory passages, with many disagreeable symptoms and possibly disastrous results. Some wood fibers contain alkaloids and ethereal oils, which seem to produce an additional toxic effect. He therefore urges that greater attention be paid to the installation of mechanical devices to dispose of the dust, spraying, wearing of dust masks, ventilation, etc."—C. K. Drinker.

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

CERTAIN FUNDAMENTALS IN EARLY DIAGNOSIS OF PULMONARY TUBERCULOSIS. *Lawrason Brown.* Jour. Am. Med. Assn., Jan. 14, 1922, 78, No. 2, 79-84.—"1. The diagnosis of pulmonary tuberculosis is in most instances more easily made today than formerly, but in the remainder such a diagnosis may tax the ingenuity of the cleverest physician.

"2. The diagnosis of pulmonary tuberculosis is not complete with the determination only of the presence of the disease, but must include also opinions about its activity, stage, and place and length of treatment.

"3. Pulmonary tuberculosis should be suspected in every case of blood spitting, pleurisy with effusion, persistent cough, undue fatigue, loss of weight, fistula-in-ano, or prolonged exposure to infection, whether in childhood or in adult life.

"4. It should be remembered that syphilis and tuberculosis respect no one.

"5. He who fails on examination to strip the patient to the waist may injure not only the patient but himself as well.

"6. He who would diagnose pulmonary tuberculosis early must be willing to pay for it in time and care and patience.

"7. Auscultation is vastly more helpful to him who is not fully proficient in the elicitation of physical signs than are percussion and inspection.

"8. The detection of râles is the most important factor in the physical diagnosis of early pulmonary tuberculosis.

"9. Failure to detect moderately coarse râles in pulmonary tuberculosis is due more often to ignorance of how to produce them rather than to inability to hear them.

"10. In early stages of the disease, râles are to be heard only after a simple or an expiratory cough.

"11. Persistent abnormal signs above the second rib and third vertebral spine, at one or at possibly both apexes, demand a diagnosis of pulmonary tuberculosis until it can be disproved. Conversely, such signs at one or both bases indicate nontuberculous disease until disproved.

"12. Stereoscopic roentgenograms, carefully taken and carefully interpreted, may reveal slight or extensive pulmonary tuberculosis which by ordinary methods of physical examination may escape detection.

"13. In any doubtful case, pulmonary tuberculosis should never be excluded without a careful roentgen-ray study.

"14. The presence of three or four or more tubercle bacilli in the sputum is the surest proof of the presence of tuberculosis in the respiratory tract.

"15. Repeated negative sputum examinations do not exclude pulmonary tuberculosis.

"16. It should be borne constantly in mind that any case in which no tubercle bacilli have ever been found may not be tuberculosis, and this fact should be emphasized always when extensive physical signs or a long history is present.

"17. Next to tubercle bacilli, the presence of moderately coarse râles or a parenchymatous roentgen-ray lesion above the second rib and third vertebral spine is the best evidence of pulmonary tuberculosis.

"18. Hemoptysis of a dram or more without heart disease or acute pulmonary infection, and idiopathic pleurisy with effusion, demand a diagnosis of suspected pulmonary tuberculosis and careful study.

"19. The five cardinal diagnostic points in pulmonary tuberculosis are tubercle bacilli, moderately coarse râles and a parenchymatous roentgen-ray lesion above the second rib and third vertebral spine, hemoptysis of 1 dram or more, and pleurisy with effusion.

"20. At least one or more of these points must be positive before a diagnosis of pulmonary tuberculosis can be made.

"21. If all five cardinal diagnostic points are lacking, a negative diagnosis in regard to pulmonary tuberculosis can be made; but in 1 or 2 per cent. we may be in error.

"22. A negative subcutaneous tuberculin test in an early case enables one to tell the patient that treatment at this time is not necessary.

"23. The diagnosis of clinical activity must be based largely if not entirely on symptoms and not on physical signs.

"24. Pathologic changes in the lungs can begin before any signs of clinical activity are present and continue long after all have disappeared.

"25. Cough and expectoration, and even in certain cases tubercle bacilli in the sputum, are not positive evidence of activity.

"26. Finally, one should imagine oneself in the patient's place, give his case the study one would ask for oneself, and not subject him to loss of time, of health and possibly even of life, by hasty conclusions drawn from carelessly collected and insufficiently considered data."—C. K. Drinker.

THE DIETARY REQUIREMENTS IN PULMONARY TUBERCULOSIS. *William S. McCann.* Am. Rev. Tuberc., Jan., 1922, 5, No. 11, 870-875.—"1. Estimates of the total daily energy requirements of patients have been arrived at by determination of the basal heat production, making suitable additions for the effects of fever, food ingestion, and of coughing upon the metabolism.

"2. The difficult question of deciding upon the proper proportions in which the foodstuffs, protein, fat, and carbohydrate should be combined, has been approached by a consideration of the close interrelation of the metabolism with the respiratory and cardiac functions. The aim has been to devise a diet which will increase as little as possible the volume of respiration and the circulation rate through the lungs, in order to limit the functional demands upon an injured organ."—M. Dent.

THE POTTERY INDUSTRY AND TUBERCULOSIS. *Thiele.* Abstracted from Ztschr. f. Tuberk., 1921, 34, No. 3-4, in Hyg. Rundschau, Nov. 1, 1921, 31, No. 21, 671.—Since the reports from Jena, which brought into question the findings of Koelsch respecting the prevalence of tuberculosis as an occupational disease among workers in the porcelain industry, the industrial medical officer of Saxony has given attention to the same problem, and has reached the same conclu-

sion as Koelsch. He finds that 5 per cent. of 686 persons examined showed signs of tuberculosis of the lungs. More than 50 per cent. of the workers engaged over thirty years in the pottery industry suffered from "Staublungen." About the same conditions were found among earthenware workers; 6.44 per cent. had pulmonary tuberculosis and more than 30 per cent. "Staublungen." —G. E. Partridge.

The Decrease in Anthrax Mortality in Italy. *G. Gherardi.* Il Lavoro, Nov. 30, 1921, 12, No. 7, 193-203.—Italy, a country predominantly agricultural, has always had an anthrax rate far above the average. In recent years, however, the combined effect of hygienic precautions and the therapeutic use of anti-anthrax serum have resulted in a reduction in the number of deaths from anthrax and in the proportion of fatalities from among anthrax cases.

Statistics of mortality reckoned in five-year periods from 1887 to 1916 show that the deaths have fallen from 20.8 per million of population to 6.2. This is for the whole country. The different regions show varying rates according as the agricultural part of the population predominates. Thus, during the period given above the rates for Calabria and Basilicata, which are purely agricultural, were 45 and 90.5 per million of population, while Venetia and Lombardy had rates of only 1.9 and 2. Throughout the whole country the mortality from anthrax during thirty years has been reduced to about one-third of the early figure, but this fall is much more marked in the purely agricultural regions of the south and southeast than in certain of the northern provinces where the rate has been either stationary or has even slightly increased. Thus, in the Emilia, in Tuscany and in Liguria the rate is maintained or even increased because the cities of Modena, Genoa, and Florence are centers for the importation of hides, or for the leather industries.

For the same reasons the anthrax rate for women has decreased more than that for men, since women are exposed to infection only in agricultural work, and, as we have seen, hygienic measures have been signally successful in this field, while the work of unloading, transporting and treating hides is carried on exclusively by men and is not as yet as well controlled.—Alice Hamilton.

Treatment of Anthrax in Man. *R. Monteleone.* Abstracted as follows from Policlinico, Nov. 28, 1921, 28, No. 48, 1613, in Jour. Am. Med. Assn., Jan. 28, 1922, 78, No. 4, 314.—"Monteleone extols the fine results of antianthrax serotherapy, as he witnessed it in thirty-five cases. His research has confirmed that the anthrax bacilli lurk in the tissues to the farthest limits of the edematous zone, and hence cauterization is not effectual as it cannot be applied over this entire zone."—C. K. Drinker.

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

Occupational Diseases of the Skin and Hands in California Industry. *Robert T. Legge.* Cal. State Jour. Med., Dec., 1921, 19, No. 12, 461-462.—Dermatitis among workmen consists usually in eczematous lesions, mainly the result of external irritation from exposure to dusts, chemicals and oils. "Flour, soot, cement, and sugar are typical examples and factors in simple dust irritants of the skin, while anilin and wood alcohol produce desquamative types, and machine oils and chlorin gas are examples of the group that result with pustules."

One occupational skin disease investigated was that among packers in a large tile and electric lamp manufacturing company. This disease was caused by an Arachnida known as the Pediculoides ventricosus, a tiny parasite which attaches itself to the skin by means of sucking disks and claws. To prevent further infection, fumigation by means of sulphur of the straw used for packing was advised. But with straw to be used in packing metals the sulphur process results in tarnishing the metals; in this case formaldehyde fumigation, followed by a thorough drying in the sun, is effective.

The second dermatitis investigated was that found among dried fig packers. This skin disease is attributed to the milky substance found in the stems, epidermis of the fruit, and in the latex tubes of the branches.

"Strasburger, a botanist, mentions that the latex cells secrete in the milky exudate a poisonous alkaloid, calcium malate and proteid granules." Among the fresh fruit pickers the symptoms sometimes appear in three or four hours, produce a stinging sensation, blister, and cause sanguineous oozing. "In the dried fig packers the symptoms are slower in developing, undoubtedly due to the drying by causing a destructive action of the enzyme, which is found normally in the latex of the ficus carica. The abrasive action on the cuticle of the hands of the operators when pulling open the dried figs permits directly this protein enzyme to produce a digestive and dissolving action of the tissues, and is the etiology that is responsible for the lesions."

Further investigations will be continued in the study and prevention of this seasonal occupational disease. In the meantime cotton gloves, or rubbing the hands with a high-grade mineral oil, such as the lighter automobile lubricants, are offered as preventive measures.—M. Dent.

PROBLEMS IN THE CARE OF INDUSTRIAL INJURIES OF THE EYE. *Howell L. Begle.* Jour. Mich. State Med. Soc., Nov., 1921, 20, No. 11, 443-448.—The author treats the subject under the following headings:

1. *Foreign Body in the Cornea.*—If the foreign body is not deeply imbedded, remove with a cotton swab in the first-aid room; if it is deeply imbedded, use the binocular loup and sharp spud, taking out all rust-stained tissue as well as the foreign body. If the patient complains much, use a solution of boric acid containing a few drops of 4 per cent. cocaine. Do not cover the eye with a pad. Follow up each case carefully, especially where there is any doubt about the cleanliness of the patient. If ulcers develop, cauterize with phenol, trichloracetic acid, or the actual cautery, according to the severity of the ulcers.

2. *Burns.*—More damage is done by burns than at first appears. In some cases mucous grafts from the lip should be placed over the burned area after removing the necrotic conjunctiva.

3. *Perforating Wounds.*—These should be handled with care. Some cases should not even be looked at except by a competent eye specialist. Gaping wounds of the cornea should be covered by a conjunctival flap.

4. *Traumatic Cataract.*—Operation should not be performed until the eye is white and quiet. The percentage of visual loss in an aphakic eye is at least 60 per cent.

5. *Sympathetic Ophthalmia.*—"An eye which has developed iridocyclitis after a perforating injury should be removed just as soon as it appears highly probable that there will be no useful vision. One should not trust in a two weeks' safety period." If after enucleation sympathetic ophthalmia does not develop within six weeks, one may feel fairly safe. Foci of infection should be sought for and removed.—H. G. Noyes.

OCCURRENCE AND PREVENTION OF INDUSTRIAL ACCIDENTS

ACCIDENT PREVENTION FROM A MEDICAL VIEWPOINT. *W. H. Lipman.* Nation's Health, Jan. 15, 1922, 4, No. 1, 35-36.—"Industrial medicine is almost entirely a preventive undertaking. It aims, first of all, to prevent placing the wrong man at a given job or giving the wrong job to an applicant for employment—all of which is to the benefit of the applicant, the working force, and the public. Second, it attempts to prevent the spread of illness among employees either by periodic physical examination or by early treatment of sickness. Third, by promoting efficient care of accidental injuries, it prevents complications and reduces disability to a minimum. In reality this is nothing more or less than safety work; safety for the employee, for his family, for the employer, and for the public.

"Complete safety work is composed of two parts, one as indispensable as the other: (1) a more extended use of mechanical safety devices; and (2) a recognition of the importance of the human element before and after the accident, without which mechanical protection can only prevent a small number of accidents." In discussing this second important factor in safety work, Dr. Lipman emphasizes the importance of the attitude of the foreman and of the doctor toward the pre-

vention of accidents, and during the course of their treatment.

The foreman can help to bring home to the men his interest in safety if he sees to it that all injured persons, no matter how small the injury, are sent promptly to the doctor's office; if he displays interest in the injured man after the accident has occurred; and if he calls upon or especially inquires after men seriously enough injured to be absent from work. The foreman must never attempt to treat injuries himself, and should discourage fellow workmen from giving the injured person advice as to treatment.

The plant physician can contribute his part toward imbuing the men's minds with the advantages and desirability of safety work if he attempts to make the men feel not only confidence in his professional ability but also confidence in the fact that he is their friend and counselor. "He must make them feel that they can come to him with their accidents or their claims for compensation and receive the best kind of advice; advice that is fair both to them and to the company." He must treat the injured men like patients and not like "cases" in whom his only interest is to make an accident report.—Katherine R. Drinker.

Iron-Mine Accidents in the United States in 1920. U. S. Bur., Labor Statis., Month. Labor Rev., Nov., 1921, 13, No. 5, 1105-1106. — According to a preliminary statement 45,990 men were employed in the iron-mining industry in 1920, and reports from the iron-mine operators show that there were 106 deaths from accidents in 1920, and 9,072 non-fatal injuries — a decrease of 33 fatal and 26 non-fatal accidents as compared with the figures for 1919. These figures indicate a fatality rate of 2.34 per 1,000 men (300-day basis) and an injury rate of 200.49.

Of the 106 fatal accidents during the year, 76 occurred underground, 10 in shafts, 6 at open-pit workings, and 14 in surface shops and yards. Of the 9,072 non-fatal accidents, 6,565 occurred underground, 169 in shafts, 1,010 at open-pit mines, and 1,328 at surface shops or yards.—G. E. Partridge.

Accident Prevention in the Rubber Industry. *H. S. Poole.* Safety Engin., Dec., 1921, 42, No. 6, 254-259.—The more important phases of safety work particular to the rubber industry are discussed in this article, and are broadly classified under the following headings: fire, accidents due to small tools, hazardous machinery, and vapor poisoning.—R. M. Thomson.

What the Safety Inspector Must Do and What He Has Done. *J. G. Shaw.* Safety Engin., Dec., 1921, 42, No. 6, 260-262. —This article contains a discussion of the purposes and results of safety inspection work from the insurance companies' viewpoint.—R. M. Thomson.

Electrical Hazards Are More Dangerous than Mechanical Ones. *W. J. Pefferly.* Safety Engin., Dec., 1921, 42, No. 6, 265-268.—This article pertains to the electrical equipment in factories, and gives safety notes on the more common apparatus. —R. M. Thomson.

Safety Demands Americanization. *L. M. Stowell.* Safety Engin., Dec., 1921, 42, No. 6, 273-274.—This short article illustrates the positive need of systematic safety education in the shop in order to protect all workers from the indifference, ignorance and fatalism of a relative few in their midst.—R. M. Thomson.

INDUSTRIAL SURGERY

Dressing the Industrial Injury Correctly. *Virginia L. Montgomery.* Am. Jour. Nursing, Jan., 1922, 22, No. 4, 269-271. —The treatment and dressing of the minor industrial injury differ from the ordinary technic of the hospital in important ways. Reduction to a minimum of the loss of time by elimination of all unnecessary redressing and by strict attention to everything that can shorten the time of healing is of special importance to industry. Care must be used to attach the bandage firmly and to make it

adequate for protection, but at the same time as trim and as little bulky as possible. Often a double bandage may be needed, one to be removed when soiled. Using the common zinc oxide adhesive plaster, the nurse can with ingenuity overcome many difficulties. A bandage is a little thing, but of great importance to industry, and the science of its proper application is worthy of all the efforts of the industrial nurse if she would become of the greatest value to her employer. —G. E. Partridge.

INDUSTRIAL PHYSIOLOGY: NUTRITION, METABOLISM, FATIGUE, ETC.

Length of Work Day and Industrial Health. *Reynold A. Spaeth.* Nation's Health, Jan. 15, 1922, 4, No. 1, 32-33.—This article is a discussion of the difficulty—indeed, the impossibility—of determining by statistical investigations the ideal length of the working day. The problem, since it involves the health and happiness of human beings, and not solely the matter of maximum output, is a social-ethical problem, and not a purely scientific one. "The failure," according to Dr. Spaeth, "to distinguish clearly between these two levels—the unmoral and dispassionate scientific level and the social-ethical one—has led to a vast amount of controversy and misunderstanding." Sidney Webb perceived the real nature of the work-day problem thirty years ago when he wrote:

"The demand for shorter hours of labor has arisen among the working classes, not so much from the conviction that their present hours are injurious to health—though that in many cases is the fact—not so much from the theory that shorter hours mean higher wages—though that theory is in the main sound—but from the strongly felt desire for additional opportunities for recreation and the enjoyment of life."

Science can undoubtedly aid us in indicating the advantages of short hours in one industry and of long hours in another—especially, for example, in industries where we deal with 90 to 100 per cent. machine processes—but there is no universal right or wrong working day, which can be demonstrated statistically. In order to attain the maximum yield from labor, the elements of work must be proportioned to the physiological requirements of the workman. The speed of economical work must be determined by precise and specific studies in each industry, or, it may be, in each shop.—Katherine R. Drinker.

WOMEN AND CHILDREN IN INDUSTRY

State Laws Affecting Working Women. U. S. Dept. Labor, Women's Bur., Bull. No. 16, Washington, 1921, pp. 51.—This is a very useful summary of the various state laws affecting women's work. The survey includes the acts of the state legislatures and the regulations of state industrial boards which usually have the force of law. Not all the laws have been considered, but only those affecting the length of the working day and the total weekly hours; rest periods and time for meals; night work; home work; mimimum wage; and mothers' pensions. Laws regulating working conditions have not been included, nor have laws forbidding employment in certain occupations, since there are a great number of these with wide differences among the states.

In addition to laws limiting daily hours in specified industries or occupations, five states have legislation supplementing the laws regulating both daily and weekly hours, and limiting only the weekly hours for certain industries or occupations. "A comparison of the charts will show that the states which have laws establishing the shortest working day and week are also the states which bring the greatest number of industries or occupations under the provisions of the law."

Nineteen states, the District of Columbia and the Territory of Porto Rico have pro-

vided for breaks in the working day, and so insure women against too continuous employment. Twelve of these states have limited the number of days that a woman may work in succession, in most cases to six out of seven. Fourteen states and the Territory of Porto Rico have provided that a period of time, varying from thirty minutes to one hour, is to be allowed for the noonday meal. Twelve states, also the District of Columbia and Porto Rico, have ruled that a woman can work only a fixed number of hours, usually five or six, without either a meal period or a rest period of some kind. Thirteen states and Porto Rico prohibit night work for women in certain industries or occupations.

No state has adequately protected its women, however, from injurious hours of labor, since a law needs to specify not only a definite number of hours per week but a definite number of hours per day and days per week. Neither a daily nor an hourly limitation alone is sufficient. Provision should be made also against too long continuous employment; simply to provide for a lunch period of definite length is not enough. The states which have industrial commissions are covering all these points more rapidly than those depending on separate acts of their legislatures for each step.

About one-fourth of the states have laws either prohibiting or regulating home work. Twelve states and the District of Columbia and Porto Rico have established a minimum wage for women workers. Forty states and two territories have mothers' pension laws.

Maps and charts make all the data of the survey available for detailed consideration. —G. E. Partridge.

INDUSTRIAL SANITATION: FACTORY CONSTRUCTION, ILLUMINATION, VENTILATION, HEATING, WATER SUPPLY, SEWAGE DISPOSAL

Good Lighting at Low Cost. *F. I. Kinsman.* Factory, Jan., 1922, 28, No. 1, 106.—This short paper states that the cost of lighting for one firm was cut 60 per cent. by the installation of mirrored reflectors. It goes on to say that cutting down on lighting is wasteful economically as the workman's time is more expensive than the cost of increased lighting.—M. Dent.

Making Light out of Darkness. *M. R. Jacobs.* Factory, Jan., 1922, 28, No. 1, 102, 104.—Few factories can, under normal conditions, get all the daylight that they require. One textile mill adopted a system of prism lighting which consisted "merely in substituting for the ordinary window glass a pane made of glass with a prism surface. These prisms will collect the light from all angles and refract it into the shop. . . . It is evident that it is quite necessary to have the prisms at the proper angles. Where there are a number of floors requiring the same intensity and direction of light, prisms must be varied to meet the conditions on each floor.

"In deep light wells or courts where there is almost never direct sunlight, glass canopies are used in addition to the prism window glass. They are placed over windows, and can be set at a particular angle to the walls, so that the light rays are drawn from the sky, received and controlled by the prism, and thrown directly into the interior of the building.

"Since these prism windows have been installed, this concern has been able nearly to halve its light bills, to say nothing of the better working condition, both for safety and increased production."—M. Dent.

Why White Walls Pay? *J. R. Rogers.* Factory, Jan., 1922, 28, No. 1, 96, 98.—A thorough study of the reflecting values of different colored paints in relation to white paint was made by a Detroit manufacturing firm with the following results: white 100 per cent.; light green 53 per cent.; light yellow 49 per cent.; light buff 44 per cent.; light gray 27 per cent.; brown 6 per cent.; and red 5 per cent.

Two charts are given, one showing the average hours a day of sunshine, cloudiness, and darkness for each month, and the other showing the number of deaths occurring from industrial accidents. On analysis, one finds that the largest number of accidents

occur during the darker winter months. It takes about four and a half times more electrical energy to light a plant with dark walls as it does to light the same plant with white walls. The difference between the actual cost of lighting in these two types of plants represents a saving which would easily pay for the cost of painting.

Finally, it is pointed out that good lighting contributes toward accident prevention and safety, and raises the whole morale of a plant. —M. Dent.

How Clean Windows Cut Cost. *P. J. Harrison.* Factory, Jan., 1922, 28, No. 1, 98, 100.—That diminished efficiency results from improperly cleaned windows was demonstrated when tests were made in one factory, where the windows were not cleaned for several months, which showed that fully 50 per cent. more light was admitted after a good cleaning. Not only is the cost of artificial illumination greater when windows are dust coated, but there is a bad psychological effect from dirt and gloom.—M. Dent.

Recommendations for Lighting Industrial Establishments. Mass. Dept. Labor and Industries, Jan., 1922.—A committee appointed by the Department of Labor and Industries has drawn up a proposed set of regulations to govern industrial lighting in the state of Massachusetts. The types of work included in the proposed regulations have been divided into eight classes according to the intensity of illumination required, and range from the minimum figures of 0.02 foot-candles for "roadways and yard thoroughfares" to a minimum of 7.00 foot-candles required for "extreme cases of fine work." The classification of the work under one or more of these eight divisions is to be determined by the inspectors, subject to review by the department.

Rules are suggested to govern the shading of lamps or working spaces, distribution of light on work, entrance and exit lighting, switches and controls, maintenance, and natural lighting.

The code is to be tried out by employers before being adopted, and a public hearing is to be held on May 16 for purposes of discussion and possible alterations. The committee emphasizes the importance of adhering to a uniform interstate code, and this proposed code differs but little from that approved by the American Engineering Standards Committee. Copies of the proposed code may be obtained from the Department of Labor and Industries, 473 State House, Boston.—Philip Drinker.

The Influence of Atmospheric Conditions on Industrial Efficiency. *H. M. Vernon.* Jour. State Med., Dec., 1921, 29, No. 12, 353-362.—Moving air, even if it contains a considerable amount of exhaled carbon dioxide, is more invigorating than pure but stagnant air. Hill's kata-thermometer is a fairly accurate device for measuring slight air currents. If the kata cools half as fast again as it does in still air, the air currents are moving at 50 feet per minute; if it cools twice as fast, they are moving at 142 feet, and if three times as fast, at 410 feet. Hambly and Bedford found in boot and shoe factories an average air velocity of 36 feet per minute, though in 10 per cent. of the shops it was 70 feet or more. Bedford and Vernon found in the badly underventilated potters' shops a velocity of 18 feet per minute in winter, and 29 feet in summer. The same is found in cotton weaving sheds.

The term "draught" is very indefinite, as it depends on the temperature of the moving air and upon the individual exposed. In shops where fairly active work is done the temperature should be between 60° and 65°, though it is necessarily higher in summer weather. Potters appear to have gotten acclimatized to a stuffy atmosphere, for at times, when investigators found it almost oppressive, they considered it "just comfortable."

There is no direct and exact proof of an influence of atmospheric conditions upon efficiency and productivity in many industries, but certain trades present very suggestive facts on this score. Vernon found a seasonal variation in the output of rolling-mill men in the tinplate trade, the average output in August being 10 per cent. less than in January. In intermediate months the output showed intermediate values which ran parallel with the mean air temperatures determined over the seven-year period investigated. It is argued that the installation of a thoroughly efficient system of ventilation in an

unventilated works might increase the average output for the whole year by about 12 per cent. Temperature effects restricted the outputs of laborers in open-hearth steel smelters, in steel rolling mills, in puddling wrought iron and in deep mines.

Acclimatization is another factor fixing the endurable limit of temperature. This is brought about by adaptation of the heart, the pulse rate not being so markedly accelerated; by reduction in the respiration rate; and by acceleration of the perspiration rate.

The question of humidity is especially important in linen and cotton weaving. The weavers show a considerable lowering of blood pressure as compared with other industrial workers, and there is little doubt that their efficiency is impaired by the atmospheric conditions under which they work.

Atmospheric conditions influence efficiency indirectly through the effect which they have on the frequency of accidents, as was found in two large shell factories during the War. Accident frequency was at a minimum at 67°; at temperatures below and above this point it increased rapidly. The optimum temperature for accident immunity is rather higher than that for working efficiency, but the frequency is only a little greater at 60° to 65° than at 67°, so that this is probably the best temperature range to aim at.

The high mortality in the potters' trade may be partly due to the overheated state of their shops, quite apart from the dust hazard also existing. The less the ventilation, the hotter and more humid the atmosphere, and the more crowded the shops, the greater the number of bacteria present; and every worker, healthy or unhealthy, thereby runs an increased risk of infection—and this risk is sometimes very great.—Barnett Cohen.

Providing Good Toilets. *R. B. Heathcote.* Factory, Jan., 1922, 28, No. 1, 116.—The B. F. Goodrich Company uses "8-foot units of white-enameled steel-ware equipped with five goosenecks provided with spray-heads about two inches in diameter, located 20 inches from the bottom of the lavatory, through which water mixed with steam flows with some pressure. Also between each gooseneck a liquid soap dispenser, of a tilting style, is attached, filled with a good quality of liquid soap." Other good features are that the lavatory units have no stoppers at the waste openings and that paper towels are furnished.—M. Dent.

Cleaning Cuspidors. *F. K. Douglass.* Factory, Jan., 1922, 28, No. 1, 112, 114.—The B. F. Goodrich Company describes the following method of cleaning cuspidors in the hope that the suggestions may be of use to other plants.

"A rectangular metal box is used for both collection and distribution, having a cover in four parts (this prevents exposing the contents of carriers to those not in sympathy with the tobacco habit), placed on a 4-wheel truck and made demountable in order that the load, box included, may be promptly removed from the truck, and a load of clean cuspidors started on its tour of distribution and collection.

"Cuspidors are emptied into a digestor composed of a ¼-inch screen receptacle placed over a sewer opening, all of which is surrounded by a metal cylinder with foot-operated cover. When the solid matter has filled the screen receptacle it is removed from the cylindrical envelop and an empty clean one replaces it, the full screen being emptied into a garbage can and covered, ready for final disposition at the incinerator.

"The cuspidors after being emptied at the digestor are passed to a bench provided with racks properly equipped with pegs on which to set the bowl and covers of cuspidors. These racks are then placed in a machine which is provided with warm water into which has been placed a washing solution. The water is pumped into the cuspidors through rapidly revolving sprays with considerable force. When this washing is done, which requires about 1½ minutes, the pump is stopped and a douche of steam and hot water is thrown on them, thereby rinsing them of the washing solution, and thoroughly cleansing and disinfecting the cuspidors. They are then removed from the trays and placed in the rectangular box, and are ready again for distribution. Of course, when trays are removed from the machine, four more trays replace them, and so on in multiple. The cuspidors used in this factory, about 5,000 in number, are made of galvanized metal, about 9 inches in diameter, with removable top which is concave with a 2-inch opening. All cuspidors are cleaned every day."—M. Dent.

INDUSTRIAL MEDICAL SERVICE: MEDICAL DISPENSARIES AND HOSPITALS IN INDUSTRIAL PLANTS

HEALTH SERVICE FOR SEATTLE BUILDING. *Helen A. Carnes.* Hosp. Management, Dec., 1921, 12, No. 6, 56, 58.—The Metropolitan Building Company has adopted a policy of hiring employees who are fit, of trying to keep them fit while they are working for the company, and of caring for them when they are ill. The company has a doctor who examines every applicant for work and decides what position he or she is physically able to fill. Old employees are given periodical physical examinations and advice as to treatment, if any is necessary.

In examining an employee, the doctor takes a brief family history, a personal history, height, weight, pulse, temperature and blood pressure, examines the nose, throat, heart and lungs, and makes an analysis of the urine and a careful record of all defects. All findings are entered on the examination blank. If any recommendations are made, the personnel department sees that they are followed out.

The company pays employees for absences on account of illness after they have been employed six months and after the third day of illness. It also maintains a small summer camp where employees may spend their vacations rent free. The company sees a return for all these benefits in increased enthusiasm and co-operation on the part of employees, and in lessened absenteeism and labor turnover.—M. Dent.

HEALTH SERVICE OF STETSON COMPANY. Hosp. Management, Dec., 1921, 12, No. 6, 60, 62.—The John B. Stetson Company of Philadelphia has every comfort and health provision possible for its employees. These provisions include factory and office buildings of modern construction, with maximum light and ventilation, cafeterias, rest rooms for women, first-aid room, dental department, and a sixty-bed hospital.

The first-aid room is supervised by a graduate nurse and her assistant. Minor accidents and ailments are treated there; serious cases are sent to the hospital or cared for by the medical director. The company medical director has daily office hours at the plant, and employees may call for advice and medicine for the sum of 50 cents.

Dental service is available from 9 o'clock to 5 o'clock, two dentists being in attendance, one in the morning and one in the afternoon. A small charge is made for dental service also.

The health service has a visiting staff consisting of a welfare worker and a graduate nurse, who visit all employees after they have been absent two days. The Stetson hospital gives general service besides caring for employees. Only 13 per cent. of all patients cared for in the hospital in 1919 were employees. An employee may have a free bed in the ward or in a semi-private ward, or he may pay; a deduction of one-third the usual charge is made for him if he wishes to pay.—M. Dent.

HEALTH SERVICE OF ARMOUR & CO. Hosp. Management, Jan., 1922, 13, No. 1, 58, 64.—Armour and Company make no pretense of being actuated by benevolence in maintaining their employee health service, but do so from purely business motives in an endeavor to reduce time lost, absenteeism, and labor turnover.

The Chicago plant of the company has a large, centrally located and well-equipped hospital with a personnel of twelve, which includes an X-ray specialist and a dentist. Employees are instructed in hygiene and care of the health. The dental work done by the company is mostly prophylactic and advisory, dental work being advised if serious conditions are found. If the employee is not financially able to have the work done, the necessary funds are advanced by the company.

A gymnasium for men, rest rooms for girls, corrective exercises, and aesthetic and folk dancing for girls are some of the different kinds of health service rendered. Any worker who has illness in his family may request the company physician to visit his family. The company also assists in the maintenance of a sanatorium in Arizona for tuberculous employees.—M. Dent.

AN INDUSTRIAL EMERGENCY HOSPITAL. *Bert T. Barnes.* Nation's Health, Jan. 15, 1922, 4, No. 1, 37.—This paper is a brief description of the equipment and work of the emergency hospital at the ship and repair yard of the Morse Dry Dock and Repair Company, Brooklyn, N. Y. The author emphasizes especially

the continuous day and night service and the follow-up work of this hospital; the effort to give medical treatment to all injuries, no matter how trivial; the utilization of specialists in cases requiring unusual attention; the visiting of employees' families by the hospital nurses; and the co-operation between the hospital staff and the editors of the employees' magazine, in their mutual efforts to promote safety work.—Katherine R. Drinker.

1921 AND THE INDUSTRIAL HOSPITAL. *Sanford DeHart.* Hosp. Management, Jan., 1922, 13, No. 1, 56-57, 64.—Many industrial hospitals were curtailed in 1921 for the following reasons:

1. The business depression.
2. Over-expansion of the hospital department. Sometimes the personnel comprised not only doctors and nurses, but also physiologists, osteopaths, etc.
3. Because the physician or nurse failed to keep the plant manager informed by weekly or monthly reports of what the hospital was accomplishing. When the manager knows what is being done by the hospital he is not slow to see the humane and economic advantages of such an institution.

The physician or nurse of an industrial hospital is doubly valuable because he or she has gathered a knowledge of the principles governing accident prevention and modern manufacturing methods and can make remedial suggestions so that the same injury will not occur twice.

In the R. K. LeBlond Tool Company the accident prevention work was placed under the supervision of the medical department three years ago. The remainder of this article points out how the co-operation between the medical and engineering departments has resulted in increased efficiency and safety within the plant. One example will suffice to illustrate this point. Traumatic conjunctivitis, blepharitis and keratitis were especially prevalent in one department. A conference was called between the medical and engineering departments with the result that a safety guard was installed which has entirely eliminated this hazard.—M. Dent.

INDUSTRIAL NURSING

INDUSTRIAL NURSING AS A MEANS OF FIGHTING TUBERCULOSIS. *Lee K. Frankel.* Pub. Health Nurse, Jan., 1922, 14, No. 1, 3-7.—This is a very general discussion of the possibilities for good in the work of the industrial nurse (including both the shop nurse and the nurse of the visiting nurses' association) as an educator, in close contact with both the public and the industrial management, and bringing to the employer a knowledge of the home conditions of his workers. It is the business of the industrial nurse to know the needs of the workers, not merely during the hours of work, but at all times, and to see that industry takes proper care of its workers and extends its interest to all the conditions upon which welfare and efficiency depend.

One of the natural results of such general oversight will be the periodic health examination, and then we shall be able to find tuberculosis in its earliest stages and can apply treatment with every probability of cure. The results of the experiment in Framingham where two-thirds of the population were examined show that at present not nearly all of either the early or the advanced cases of tuberculosis are being reached.

The work of the Metropolitan Life Insurance Company of New York shows what may be done. There are approximately 275 employees working in the New York office, all of whom have had tuberculosis, and have had treatment at the company's sanatorium. These cases were discovered because the company requires periodic medical examinations. The nurses, by going into the homes, help to find the early conditions producing tuberculosis. Eighty-five per cent. of those treated at the sanatorium have been returned to work with the disease corrected.

As a further illustration of what may be accomplished by adequate attention to the whole problem of the employee, the welfare work of a large industrial concern in the South is mentioned, which employs fifty

physicians and a large number of nurses and has a hospital on which it is spending a million dollars. It is a part of the work of this system to extend care to the families of the workers at all times, not merely when there is sickness.—G. E. Partridge.

INDUSTRIAL PERSONAL AND COMMUNITY HYGIENE: HOUSING, ETC.

How Health Talks Help. *T. E. Raymond.* Factory, Jan., 1922, 28, No. 1, 112.—The author sets forth the advantages of occasional short health talks to employees, reminding them of the fact that personal hygiene is necessary to health. An example of such a talk is given.—M. Dent.

Creating Interest in Health. *J. R. Jacobs.* Factory, Jan., 1922, 28, No. 1, 108.—In this plant pamphlets and posters upon the bulletin board had failed in the past to arouse any interest in health. The doctor thereupon devised a plan to divide the plant clubs into teams between which a health competition should be held for the period of a month. "Cards were given all members containing the information and rules. Daily exercise, gymnasium work, swimming, 8 hours' rest at night, proper diet, sleeping in the fresh air and general care of the body were counted. The perfect score was 100 and failure to observe the rules was checked by a committee each day."

The plan succeeded admirably and general interest in health was spread throughout the plant.—M. Dent.

INDUSTRIAL INVESTIGATIONS AND SURVEYS

Motion Study in Metal Polishing. *E. Farmer,* assisted by *R. S. Brooke.* Indust. Fatigue Research Board, Report No. 15, Metal Series No. 5. His Majesty's Stationery Office, London, 1921, pp. 65.—This report embodies the results of an extensive investigation into the possibilities of applying motion study methods in the buffing trade. "The effects on output and fatigue are clearly indicated, and certain principles are suggested, not confined to the particular process investigated but immediately applicable to all trades in which the grinding or polishing of metal is carried on." The substance of the report is summarized as follows:

"1. By close observation of the movements of a number of emery wheel filers, provided with seating, glass screens and contoured rests, the unproductive time was considerably reduced. Then by training, and the institution of a team in the case of 'set' forks, the output in two shops increased without any apparent increase of effort on the part of the workers.

"2. The design and provision of seats for outside dolliers were arrived at after a close study of an individual worker on a wide variety of work over 6-day periods, standing and seated. The effects of seating resulted in greater buoyancy in the workers, and the output seated is slightly higher than with continuous standing. . . . .

"3. The methods of work and movements of a number of outside grease dolliers were systematically observed. Astonishing differences were noticed between workers with long years of experience. Eventually a systematized set of movements was employed in a training scheme which resulted in great improvement in the work and piece-work earning of many of the older hands. This training with novices in a few days enabled a standard efficiency to be attained hitherto said to be attained only after months of practice.

"4. A similar study of the movements in roughing had also satisfactory results when applied to a training scheme, although in this process a longer time is required to attain proficiency on account of the more complicated movements. The attempt to reduce the number of strokes, to do more work with the hands and less movement with the body, quickly leads to a more rhythmic use of human energy with increased comfort to the in-

dividual and improved quality of the work.

"5. The process of glazing on wheels dressed with emery was under observation, and although the material side of the question is somewhat outside the scope of this investigation, the change of practice, by relieving some of the more strenuous work of roughing, gives a noticeable relief to the worker and considerably reduces the rosining required to keep the roughing wheels in condition. This glazing of the edges of spoons and forks is of special interest, as it is one of the chief differences between French and English practice.

"6. A recording wattmeter connected with a separate motor driving an individual wheel enabled a graphical illustration of every separate movement, and an approximate estimate of its duration and strength, to be obtained. These records for the moment have been specially directed to observing the incidence of fatigue at different periods of the day's work.

"7. Since in actual practice no worker can continuously perform any operations of the nature of polishing throughout a working day without suitable rest pauses, an attempt was made to study the effect of artificially introducing regular pauses each hour and comparing the time thus allowed and the effect on the work with the time voluntarily taken by a steady worker.

"8. Attention is drawn to some preliminary results obtained by running an insiding buff at different speeds."

From the findings reported it is concluded:

"1. A definite course of training should be given to all workers who enter the buffing trade, instead of allowing them to pick up their trade as best they can.

"2. This course of training should be based on the principles indicated in this report. No claim is made that they represent a final stage of perfection, but only that they are more satisfactory than the traditional methods.

"3. Further experiments should be carried out in the buffing trade. Among the problems which require research is that of vibration. . . . The connection between rhythm, fatigue and rest pauses should be more carefully examined.

"4. Efforts should be made on the technical side to devise an abrasive which is less dusty and dirty than loose sand, and not so coarse as an emery wheel.

"5. Seats should be provided for the workers and their benches should be modified in such a way as to permit the use of the seats without discomfort being caused by inadequate space for the legs.

"6. Further research should be carried out on the proper size and breadth of wheels and the most economical speed at which they should revolve."—M. C. Shorley.

AN INVESTIGATION INTO THE PACKING OF CHOCOLATES. *E. Farmer* and *A. B. B. Eyre.* Jour. Nat. Inst. Indust. Psychol., Jan., 1922, 1, No. 1, 12-16.—Fatigue in chocolate packers is mental rather than physical, as the chocolates have to be packed in such a way as to produce an artistic effect. By introducing a new type of bench and arranging the varieties of chocolates in a more convenient way for selection, so as to increase the rhythm of the movements and diminish the need for voluntary decisions, the output was increased 36 per cent., though part of this improvement was due to the maintenance of a more regular supply of chocolates. The hourly output curve, previous to the improved conditions, showed a rapid fall during the course of the afternoon spell, but subsequently it kept at a steady level, presumably because of a reduction in fatigue.—H. M. Vernon.

AN INVESTIGATION INTO THE TIN-BOX INDUSTRY. *E. Farmer* and *R. St.C. Brooke.* Jour. Nat. Inst. Indust. Psychol., Jan., 1922, 1, No. 1, 9-11.—Conditions which induced unnecessary fatigue in the workers were investigated, and in consequence many small improvements in the manufacture of tin boxes were introduced. For instance, the size of the piece of short metal supplied to the workers was found to be unsuitable. On substitution of a better size, a saving of time amounting to from 30 to 40 per cent. was effected in some instances. The sheets of tin were not kept at the right height, and the girls had to stoop to pick them up. By placing the sheets on a box, the stooping was avoided, and the time of the complete stamping operation was reduced 9 per cent. Again, some girls were found to be more expert at soldering round boxes than angular boxes, and others showed the opposite capacity; they were, therefore, sorted out and put on

the process at which they were most efficient. Other experiments in seating and in rest pauses were carried out, with useful results.—H. M. Vernon.

INDUSTRIAL PSYCHOLOGY AND INDUSTRIAL MANAGEMENT IN ITS HEALTH RELATIONS

THE HUMAN FACTOR IN INDUSTRY. III. *C. H. Northcott.* Indust. Management, Dec., 1921, 62, No. 6, 363-369.—This is a general study of the instincts and desires displayed in industrial life, with the practical conclusions for industry based upon the following propositions: (1) The springs of human action lie in instinctive predispositions which experience hardens into desire or aversion, and habit consolidates. (2) A normal and healthy life is dependent upon adequate satisfaction of these innate tendencies. (3) The balking or repression of these impulses causes disquiet, agitation, or some direct form of perverted conduct.

The most powerful instinct in industrial life is the gregarious instinct, and very closely related to it is the tendency to sympathetic emotion. Another important element is the impulse to gain leadership and mastery—and the capitalistic system is based largely on the cultivation of this instinct, which has greater strength when the more elementary desires have obtained satisfaction. Contrasted with this instinct is that of submission which prompts men to follow a leader. Analysis of industrial life shows other instincts, such as the creative or self-expressive instinct, appearing as an instinct of workmanship; the instinct of pugnacity; and the instinct of fear.

These instincts are powerful and urge toward expression; their repression is followed by many manifestations of disturbance. "Unlike the unused muscle they do not die of inanition." Inner conflicts are caused, and one of the most natural results of repression is anger.

There is much in industry that is repressive of the instincts. The gregarious instinct is repressed by every effort to destroy collective bargaining and every refusal to receive accredited representatives of workers. Modern conditions of industry deny the opportunity of leadership to most men. Modern industry is repressive in that it tends to suppress initiative and to discourage responsibility and self-direction. The atmosphere is mainly one of opposition. A process of modification of instincts, and hardening into habits is constantly going on, so that if we think of the behavior of man as merely a clashing of instincts we leave out one essential fact.

If the repression of instincts were final and irrevocable, nothing but disaster could result. The hope of a peaceful future lies in the alteration of the character of industry under the guidance of intelligence. Industrial engineers have set about the gradual changing of industry in the direction of the normal expression of human nature. They have shown that the gregarious instinct can receive due recognition, and it is now being demanded that industry shall afford an opportunity for the development of personality and of a full and satisfying life. It is required of industry that it become a medium for education and experience, and the means by which personal intelligence, initiative and sense of responsibility may be increased. These are demands made by the workers themselves, and arise from a clear perception of their own needs.—G. E. Partridge.

A COMPARISON OF SPEED WITH ACCURACY IN THE LEARNING PROCESS. *Mary Sturt.* Brit. Jour. Psychol., Dec., 1921, Vol. 12, 289-300.—It was formerly maintained that in learning habits involving muscular activity it is better to insist at the outset on accuracy rather than speed. Gilbreth has recently controverted this view, and maintains that speed, not accuracy, should be insisted on, for he points out that slow movements are inevitably different in form from (the same) fast movements. The question was put to a practical test with two groups of ten girls, all of them aged 12 to 14. They were selected from large groups on the strength of similar performances in various tests (memory, spelling, etc.). The groups were at different schools, so that they could not discuss the experiment with one another. Each subject was given two half-hours' teach-

ing a week in typewriting for sixteen weeks. The subjects at one school were told that speed was the important consideration, and they were given marks and prizes simply for speed; while the other group were told to aim at accuracy, and their papers were returned to them, corrected for mistakes, but with no mention of speed. Then for six weeks the instructions given to the two groups were reversed, and it was found that almost immediately the "accuracy group," though previously much slower, attained the same speed as the former "speed" group, but the speed group did not attain the accuracy of the former "accuracy" group till the end of the six weeks. Hence it appears that, so far as typewriting is concerned, the same speed is obtained finally whether or not speed is insisted on at the start. Also it seems probable that a high quality of work can be obtained finally, without insisting on a high quality throughout the learning process. Still, it seems unwise to demand speed from the very beginning, as it becomes more difficult for the learner to acquire correct movements.—H. M. Vernon.

TESTS FOR CLERICAL OCCUPATIONS. *Cyril Burt.* Jour. Nat. Inst. Indust. Psychol., Jan., 1922, 1, No. 1, 23-27.—A very elaborate set of tests for clerical occupations is described, which includes graded tests of intelligence and educational attainments, *i. e.*, tests of linguistic ability and general information, and numerous tests of speed and accuracy in typewriting and shorthand. The whole series takes about two hours, and was applied to thirty typists in the office of an Education Authority. The results of the test agreed very closely with the general views of the supervisor, and it was possible to deduce from the individual performances a list of minimal standards of merit (1) for those capable of work of a high order of intelligence; (2) for those capable of merely mechanical work; (3) for those at present unfit for practical work, but likely to become capable after further training; and (4) for those incapable of shorthand and typing. Detailed correlations will be published later.—H. M. Vernon.

INDUSTRIAL SERVICE AND MUTUAL BENEFIT ASSOCIATIONS

LECTURE CONFERENCE FOR WELFARE SUPERVISORS. Industrial Welfare Society, London, 1921.—This publication reports the proceedings of the second annual conference of the Industrial Welfare Society, which was held at Balliol College, Oxford. Conferences such as this were inaugurated during the War by the Welfare and Health Section of the Ministry of Munitions. Their success has led to their continuance; indeed, a further conference was held (also at Balliol College) by the Welfare Workers' Institute in January of this year. The value of these conferences, where the members attending live together for several days in college, meet one another for exchange of views, and hold informal gatherings at any moment, is far greater than can be evaluated by merely reviewing the lectures and addresses given.

The conference was opened by Lord Gorell, first chairman of the Miners' Welfare Committee (now succeeded by Lord Chelmsford, late Viceroy of India). He dwelt upon the unique way in which, under the Mining Industry Act, the welfare movement is being spread throughout the coal fields, and in the course of a scholarly address emphasized the importance of education to industrial welfare. Dr. Gorell spoke from his experience in organizing education for the army, and from the benefit which has resulted. That way leads to knowledge, at once the foe of unrest and the foundation of sound practice. Mr. C. D. Burns discussed economic history, with special reference to industry and to the factors concerned with industrial legislation in the nineteenth century. He showed how each advance was a step on the road to the welfare movement, by which a man should be able to find his humanity, not merely in leisure, but in his actual work. The next lecturer was Mr. E. Farmer, who dealt with industrial psychology, a subject bound to come to the front once the individuality of each worker receives attention. Stress was laid on the need for separating this subject from that of the economics of production. Efficiency may and, indeed, is bound to result, but efficiency should not be the only objective. The individual, his capacity and natural rhythms, and the way in which physical energy can be conserved and not

wastefully expended, should come first. Unprofitable industrial disputes are often based on psychological irritation, an irritation resulting from wasteful expenditure of energy; while industrial accidents are frequently an outward sign of the same inward and mundane *ennui*. Here vocational selection, occupational training and motion study are needed to enable the worker to find in his work an intellectual service, in place of a monotonous routine.

The subject of camps and camping was introduced by Mr. R. S. Wood. He told how last year railway vouchers had been issued to nearly 100,000 young persons travelling to camps, but that far too few were issued to boys industrially employed; and he impressed upon his audience the value of camp life for creating a spirit of comradeship, discipline, good form and good tone, in addition to a tradition of open-air life and of enjoying the out-of-doors. Dr. C. W. Kimmins was in his element in pressing the educational possibilities presented by the new day-continuation scheme just launched in London and elsewhere. He pointed out that welfare supervisors had here a magnificent opportunity of applying modern educational methods and, through research, of obtaining an idea of the make-up and special aptitudes of juveniles. In this way a necessary link between education and industry could and should be forged. The value of folk dances and music in recreation was made manifest by Mr. C. J. Sharp, who told of his discovery of a bit of Elizabethan England still existing in the center of the United States, where an illiterate and isolated community had preserved the songs and dances of "Merry England." This happy people, who knew how to play and live abundant lives, had retained an art nearly lost by modern industrial peoples. Folk dances and folk songs should be preserved and taught again; they are quickly learned because they are in the blood; they supply an outlet for faculties not exercised at work, and this is the true object of recreation.

The attitude of labor toward industrial welfare was the subject of a pronouncement by Mr. F. Bramley. He laid his hand on the cold Marxian doctrine that improvements which tend to make industrial conditions under capitalism more tolerable only perpetuate a wrong economic system, and declared it not merely moribund, but dead. He welcomed welfare and all means of health culture as advantageous to physical and mental development. By this means may be broken down the antagonism and suspicion only too prevalent today between employers and workers; for welfare work cannot be successful without the consent and goodwill of both workers and employers. He promised the movement the unqualified support of organized labor. This address, which should be read as published, was one of great importance, and marks the great advance made from the semi-veiled or open opposition of only four years ago.

Sir Andrew Duncan, who followed, spoke from the employer's point of view and pointed out that welfare was a movement on the part of industry itself, not driven thereto by legislation; it represented a practical problem for attack. He placed the inside-the-workshop aspect first, by which means men might come to say that they loved for its own sake the work which provides their livelihood. Welfare should start with the juveniles, to whom men should show example in craftsmanship and conduct, and employers should extend sympathy and encouragement during apprenticeship in craft training and craft discipline. In relation to outside-the-workshop activities, the employer only functions as any other citizen to maintain the spirit of welfare which endures whether times be good or bad. He held that the welfare of those employed was an obligation or burden which industry cannot afford to pass on entirely to other aspects of communal life and citizenship.

The last address was delivered by Professor E. L. Collis, who, in dealing with the health of the industrial worker, pointed out certain broad principles of health and the way in which welfare supervisors can act as apostles of preventive medicine. In so doing, he touched upon the importance of ventilation, personal hygiene, drinking water, food and light, as well as the rules underlying activity and fatigue. He, like the previous speaker, laid stress on the paramount importance of inside-the-workshop conditions, and warned his hearers against devoting too much time to the more showy and attractive subject of recreation.—E. L. Collis.

ABSTRACT OF THE LITERATURE

OF

INDUSTRIAL HYGIENE

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GENERAL

INDUSTRIAL HYGIENE. *T. Oliver.* Abstracted as follows from Colliery Guardian, 1921, Vol. 122, 307-308, by C. C. Davis, in Chem. Abstr., Feb. 10, 1922, 16, No. 3, 451. —"An address dealing with CO poisoning and other industrial hazards."

THE PROBLEM OF INDUSTRIAL HYGIENE AND THE CO-OPERATION OF PHYSICIANS IN INDUSTRIAL SUPERVISION. *H. Rasch.* Zentralbl. f. Gewerbehyg., Sept., 1921, 9, No. 9, 185-190. (Conclusion of article; the first part was abstracted in THIS JOURNAL, Jan., 1922, 3, No. 9, 205.)—Supervision of conditions in the factory and in the surrounding community should be entrusted to the same official. Industrial hygiene cannot dispense with the constant participation of physicians, acting with the technical inspectors and administrators. The plans used in Hamburg are outlined as examples of how physicians may participate in several ways in such work.—E. L. Sevringhaus.

THE PROBLEM OF INDUSTRIAL HYGIENE AND THE CO-OPERATION OF PHYSICIANS IN INDUSTRIAL SUPERVISION. *Holtzmann.* Zentralbl. f. Gewerbehyg., Sept., 1921, 9, No. 9, 190-192.—The author reiterates and emphasizes the arguments presented by Rasch in his paper by the same title, which is reviewed in the preceding abstract.—E. L. Sevringhaus.

DRAFT CONVENTIONS AND RECOMMENDATIONS ADOPTED BY THE THIRD SESSION OF THE INTERNATIONAL LABOUR CONFERENCE. Internat. Labour Office, Official Bull., Dec. 7, 1921, supplement to Vol. 4, No. 23, pp. 26.

—The Draft Conventions and Recommendations included in this number of the *Official Bulletin* are listed below for the benefit of interested readers:

Recommendation concerning the prevention of unemployment in agriculture.

Recommendation concerning the protection, before and after child-birth, of women wage-earners in agriculture.

Recommendation concerning night work of women in agriculture.

Draft Convention concerning the age for admission of children to employment in agriculture.

Recommendation concerning night work of children and young persons in agriculture.

Recommendation concerning the development of technical agricultural education.

Recommendation concerning living-in conditions of agricultural workers.

Draft Convention concerning the rights of association and combination of agricultural workers.

Draft Convention concerning workmen's compensation in agriculture.

Recommendation concerning social insurance in agriculture.

Draft Convention concerning the use of white lead in painting.

Draft Convention concerning the application of the weekly rest in industrial undertakings.

Recommendation concerning the application of the weekly rest in commercial establishments.

Draft Convention fixing the minimum age for the admission of young persons to employment as trimmers or stokers.

—M. C. Shorley.

SYSTEMIC OCCUPATIONAL DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

CENTRAL NERVOUS SYSTEM

POST-TRAUMATIC NEUROSES: THEIR MECHANISM. *Joseph Catton.* Calif. State Jour. Med., Dec., 1921, 19, No. 12, 468-471.—In this address, delivered before the Fiftieth Annual Meeting of the Medical Society of the State of California, Dr. Catton presents the attitudes of the three schools of thought which have developed as a result of the efforts to explain the basic mechanism of the mental and nervous disturbances following physical trauma. The first school holds that there is a definite organic basis for the phenomena; the second, that the disease pictures rest on a psychogenic and non-organic basis; and the third is made up of investigators who have varying opinions including organic and psychogenic features.

The following suggestions are made in the hope that they may indicate lines of investigation:

"Differential symptomatology should be worked out as between the frank and less frank organic conditions, the latter of which have been termed functional.

"Surveys should be made of the after-histories of accident cases thought to have been settled by the 'lump sum closure method.'

"Early complete examinations should be made in order to detect localizing organic signs which may later disappear.

"Experimental work on animals should be continued as regards injuries to the nervous system following physical trauma with or without external evidences of injury."—M. C. Shorley.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

DIFFUSE HEMORRHAGE OF THE HEART MUSCULATURE IN A CASE OF POISONING BY ILLUMINATING GAS. *Georg Strassmann.* Wien. klin. Wchnschr., 1921, Vol. 34, 483-484.—This rather rare occurrence is believed to have been due to the abnormal constitution of the individual described.—Barnett Cohen.

THE OCCUPATIONAL AND MEDICAL REVIEW OF WOOD SPIRIT OR METHYL ALCOHOL. *F. Koelsch.* Zentralbl. f. Gewerbehyg., Sept., 1921, 9, No. 9, 198-203.—This article presents a review of the symptoms and the types of cases of methyl alcohol poisoning, the methods of absorption of the poison, and the necessary precautions.—E. L. Sevringhaus.

HAZARDS IN WORKING WITH DENATURED ALCOHOL. BURNISHER'S ECZEMA. *F. Koelsch.*

Zentralbl. f. Gewerbehyg., Sept., 1921, 9, No. 9, 203-207.—The eczema of burnishers occurs among those using alcohol denatured with methyl alcohol, pyridine, or turpentine. The cause is not decided. It may be due to the removal of the fat and water from the skin by the alcohol itself, and by the use of the strong soap for cleansing. Simple rules for treatment are given.—E. L. Sevringhaus.

THE IMPENDING PROHIBITION OF THE USE OF WHITE LEAD AND THE METHODS OF BLOOD STUDY AS A DEFENSE. *Johannes Schoenfeld.* Zentralbl. f. Gewerbehyg., Nov., 1921, 9, No. 11, 256-264.—A variety of industries would suffer severely if the use of white lead were prohibited. The conservation of health does not demand such a step. Study of the blood has made diagnosis so much more accurate that the effects of lead can be detected before clinical signs appear. Experience of the author and of others is cited to show how early diagnoses are made and how affected individuals are cured. The author considers thirty basophilic staining red cells per million evidence of lead influence, although no intoxication may have taken place. He believes polychromatophilia to be even earlier as a sign of lead influence than the basophilic degeneration.—E. L. Sevringhaus.

LEAD POISONING AND THE INTERNATIONAL LABOUR CONFERENCE. *H. E. Armstrong.* Brit. Med. Jour., Dec. 17, 1921, No. 3181, 1042-1044.—A question arising at the Geneva Conference was whether medical science was in a position to diagnose lead poisoning properly, and the report received stated that only specially trained medical men could diagnose saturnism.

The writer complains that his efforts at the Conference to bring into the discussion the effects of volatile thinners were thwarted, and that the medical subcommittee reported that, as far as painters using white lead or other lead compound are concerned, saturnism is the chief risk (although the statistics are vitiated in several ways), and that by far the most important danger is from dust that enters through the nose and mouth.

The dust produced by dry rubbing down is the chief risk in painting, and if this is eliminated and careless work deprecated there should be little objection to house-painting as an occupation. The risks from lead poisoning in the white lead and the pottery industries have been nearly abolished by the introduction of mechanical methods of removing dust and by wise regulations. It is also proved conclusively that volatile compounds of lead are not given off by paint as has been so often asserted. Turpentine, on the other hand, is a cause of poisoning which has often been attributed to lead. In fact, all solvents of oil which can be used as thinners in paints and varnishes are lethal substances, and there is danger in repeated and continued exposure to small amounts of turpentine and similar substances.—G. E. Partridge.

INDUSTRIAL POISONING IN MAKING COAL-TAR DYES AND DYE INTERMEDIATES. *Alice Hamilton.* U. S. Dept. Labor, Bull. No. 280, 1921, pp. 87.—This report on the hazards from poisoning in the industries using coal tar dyes and intermediates is based in part on inspections of plants in the United States and in Europe, and in part on a study of all the available literature dealing with the subject. There is a brief historical review indicating the rapid change from crude and careless practices to the present stage of efficiency, a stage which, however, leaves room for much improvement. The fullest treatment is given to the benzene derivatives, but phosgene, the aliphatic compounds and inorganic compounds are also reported on. Lists of the substances that are shown to be harmful by the reports of factory inspectors both in the United States and Germany are given, with other data and a summary of the experiences of the two countries. The various processes used in manufacture are described in outline, since "it is impossible to generalize about the dangers of the color industry." There is a section on prevention of occupational poisoning, and the following topics are treated in the five appendices: structure of the benzene ring and its principal derivatives; products derived from coal (chart); rules and regulations suggested for safety in the manufacture of benzene derivatives and explosives (for Massachusetts); safety standards for the manufacture of nitro and

amido compounds adopted by New Jersey and Pennsylvania; regulations for the manufacture of nitro and amido derivatives of benzene and of explosives with use of dinitrobenzol or dinitrotoluol.

The subject, as presented by the author, is far too complex to allow brief summarizing. The paper should be read in its entirety by all interested in its topic.—G. E. Partridge.

VALUE OF CALCIUM SULFIDE IN BICHLORIDE OF MERCURY POISONING. *S. W. Sappington* and *G. A. Hopp.* Abstracted as follows from Hahnemannian Monthly, 1921, Vol. 56, 753-761, by J. S. Hepburn, in Chem. Abstr., Feb. 20, 1922, 16, No. 4, 590.—"Of 22 rabbits in which Hg was given as a poison and CaS as an antidote, 18 died, 17 within 5 days and 1 on the 6th day. Of the remaining 4 live rabbits, 1 was given a neutral test-tube mixture of poison and antidote, another had the antidote poured immediately on top of the poison in the stomach, a third survived after an intravenous injection and a fourth after excessive doses of CaS by the stomach. Only 2 of the 22 rabbits could, in the practical sense, be said to have been saved by the antidote."

A REPORT ON THE DANGERS OF PENETRATING RADIATIONS AND THE METHODS OF AVOIDING THEM. *A. Broca.* Abstracted as follows from Jour. de radiol. et d'électrol., 1921, Vol. 5, 414, in Med. Science, Feb., 1922, 5, No. 5, 451-452.—"The author begins by giving an account of emanation in which he states that it is only dangerous when confined, and especially so to those charging the tubes: those who apply either radium or its emanation to patients do not come under the direct action of its rays because of the screens. He considers the question of the effect on the atmosphere and concludes that good ventilation will avert all danger. He puts forward the hypothesis that possibly the minute trace of emanation often observable in the air is useful to life or even indispensable, and says that institutes of radium should not be classed as unhealthy institutions with the quantities at present in existence.

"*Dangers of Penetrating Radiations for the Manipulators—Methods of Protection.*—An account of the various lesions caused by X-rays and radium is given, and the author states that in institutes of radium, lesions analogous to the chronic lesions caused by X-rays are seen; leucopenia especially is mentioned. To combat this the personnel at the Radium Institute of Paris have their blood examined periodically and are given the holidays necessary to maintain the blood in order; these precautions have been found to be sufficient. In brief, the points to be observed are: (1) only handle a radio-active tube with forceps, taking advantage of the falling off of the radiation according to the square of the distance; (2) to protect deep organs from effects at a remote date use lead screens.

"*Protection of Medical Personnel and their Surroundings.*—The author states that every X-ray bulb should have an absorbent cover and every beam of rays should be as small as possible. These devices will not always be sufficient when using penetrating rays over a long period, and here advantage of the square of the distance law can be taken."

"*Conclusions.*—The younger radiologists who take the precautions mentioned above are not affected by chronic radiodermatitis or by leucocytic disorders. At present a radiological installation is not prejudicial to the neighbourhood. In conclusion the author states that those who make radiology their work are much the same as those medical men who are daily exposed to infectious diseases: the dangers in the two cases are of the same order of probability."

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

INDUSTRIAL TUBERCULOSIS. *F. Humbert.* Internat. Jour. Pub. Health, Nov.-Dec., 1921, 11, No. 6, 621-630.—The main part of this paper consists of tables derived from a study made by the Prudential Insurance Company of New York on the basis of their experience in the years from 1907 to 1912. The percentage of deaths from tuberculosis in unhealthy trades (28 trades included) is given. The statistics are said to "confirm in a

large measure findings which are now classical," but to show also some variation.

Tuberculosis of the lungs, other forms of tuberculosis and other respiratory diseases causing death are recorded for three age groups (15 to 24, 25 to 44, 45 and over) for the different occupations of the list. The occupations have been grouped also in regard to the essential hazard involved, and the percentage of deaths (in proportion to all diseases) is given for the different age groups and the types of respiratory disease for each occupational group.

It is shown that different places are taken by the same occupation according to the age, and it is also pointed out that the relative danger of tuberculosis can only be determined for any given trade by giving the tuberculosis death rate in it as a percentage of the total death rate. "This method of comparison acquits tuberculosis of various unjust accusations." The high tuberculosis mortality in certain trades corresponds with a higher general mortality.

Greenwood maintains that analysis of statistics on these points should take account of: (*a*) industrial selection—type of physique chosen by the occupation, the age at which workers enter, etc.; (*b*) industrial status; (*c*) the industrial environment. To quote from Collis and Greenwood: "The rôle of the factory is, by confinement in monotonously ventilated rooms and by causing general fatigue, to reduce the resistance of the operative to those sources of infection to which he is exposed in the natural course of life."

It is the theory of Collis and Greenwood that the industrial environment, whatever it may be, is one cause of "tuberculization;" and this theory was borne out by experiences in industry during the War. "The proportion of tuberculosis deaths, as compared with the total mortality increased from 35 per cent. to 42 per cent. in the industrial regions, but not in the others."

Tebb conducted an inquiry in some munitions factories and showed that tuberculosis (as measured by officially reported cases) was five times as frequent in the group of factories in which building construction and hygienic conditions were poor, as compared with "large modern factories, well constructed and managed in conformity with the requirements of hygiene."

Bräuning has published figures about tuberculosis among hospital nurses. The general tuberculosis morbidity in this class is 60 per 10,000, as compared with 63 per 10,000 among insured people in all occupations. But a careful study of cases shows "a marked preponderance of infection amongst women who were formerly healthy and who have had charge of cases of tuberculosis."

Maes has studied the effects of a secluded and ascetic life as explaining the predominance of tuberculosis in a Catholic congregation. But Hamel's results are in partial contradiction with the findings of Maes.

Tuberculosis morbidity and mortality statistics should be compiled on a uniform plan and should not be used without consulting both the general mortality rate and the incidence of tuberculosis relative to other industries. The influence of industrial life on tuberculosis morbidity might be reduced by the application of general measures of hygiene not specially directed against tuberculosis.

"Special surveys should be carried out for each separate occupation in order to disclose the ultimate avoidable causes of contagion and to stimulate scientific prophylaxis."—G. E. Partridge.

DISINFECTING SKINS AND HAIR FOR ANTHRAX. *Henry Field Smyth.* Am. Jour. Hyg., Sept.-Nov., 1921, 1, Nos. 5-6, 541-556.—"This paper gives details of several series of tests carried out by the author on the disinfection of skins and horse hair for anthrax.

"In these tests five strains of anthrax bacilli were employed, an old laboratory stock strain, three strains isolated from tannery soak vats and one strain isolated from horse hair.

"Especially resistant spores were obtained by preliminary growth on wheat agar.

"Rejuvenation of spores damaged by treatment, but not killed, was encouraged by subculture in dextrose-serum-bouillon.

"In testing action on skins the most satisfactory method of preparing samples was found to be intradermal inoculation of

soaked squares of skin with saline suspensions of anthrax spores.

"The lime soak of 5 per cent. CaO permitted by the Bureau of Animal Industry regulations proved to be unreliable, even after a 72-hour exposure.

"The Schattenfroh method of soaking skins in 2 per cent. HCl and 10 per cent. NaCl solution for 48 hours at room temperature gave uniformly good results if carried out under conditions similar to those employed in the tannery, and produced skins that could be made into satisfactory leather.

"Anthrax infested horse hair can be satisfactorily disinfected by several methods:

"(*a*) By steam under pressure in the autoclave (15 lbs.) for 30 minutes.

"(*b*) By dry heat—200° F. for 24 hours (but not 200° F. for 15 min. as permitted by the Bureau of Animal Industry).

"(*c*) By formaldehyde as used in England.

"Cyllin disinfectant in the strength and under the conditions certified in England will not kill anthrax spores."

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

EYE CONSERVATION IN INDUSTRY. Eyesight Conservation Bull., No. 1, 1922, pp. 29. —This pamphlet, published by the Eye Sight Conservation Council of America, presents one important phase of the study of "Waste in Industry" as conducted under the auspices of the Federated American Engineering Societies—namely, the chapter on conservation of vision. The subject is treated under three headings: hazards, vision, and illumination.

Hazards.—The effectiveness of protective methods is discussed, and reports from several large industries are included as proof of the advantages of goggles. A list of the processes or operations in which protection to the eyes is necessary is quoted from the "National Code for the Protection of the Heads and Eyes of Industrial Workers," and the requirements and standards for goggles, methods of overcoming objections to goggles, and the treatment of unavoidable accidents are given brief consideration.

Vision.—"That correction of sub-standard vision produces an increase in return that will pay for its cost—though no set of figures at hand will place this return on a dependable monetary basis—is the conclusion of the management in plants where several years of trial have provided a basis for judgment." As examples, the experiences of the Hood Rubber Company, of the Cheney Silk Company, and of Sears-Roebuck and Company are cited.

Figures are given showing the frequency of sub-standard vision, and emphasis is placed on the necessity of visual acuity standards which will give the necessary minimum for each kind of work.

Illumination.—Although the value of good lighting has been recognized for some time, it has not been sufficiently appreciated, on a monetary basis, to enforce its general adoption. This is shown in a tabulated report of the lighting conditions found in 446 plants investigated.

The requirements for efficient lighting are stated briefly, and the merits of different lighting systems are compared. "The cost for providing adequate illumination for the entire industry of the country would amount to one-half per cent. to one per cent. of wages. The cost per capita of correcting vision, instituting and carrying out measures of protection against hazards and bringing the lighting up to good standards, is definitely greater in the small plant than in the larger organizations—those employing two thousand workers or more—and the small plants are in the large majority. These smaller plants are therefore less ready to take up any of these measures unless the early returns of a dividend can be clearly shown. Reports of more study, the example of the earlier ones to take the steps, must be brought before them constantly so that efforts to check preventable loss along these lines may become more nearly universal."

A copy of this bulletin may be secured by forwarding 25 cents in stamps to the Eye Sight Conservation Council of America, Times Building, New York City.

OCCURRENCE AND PREVENTION OF INDUSTRIAL ACCIDENTS

THE PROMOTION OF ACCIDENT PREVENTION. PART II. *Schoeneich.* Zentralbl. f. Gewerbehyg., Sept., 1921, 9, No. 9, 207-211.—Injuries with disability lasting over fourteen weeks are due more to the dangers of daily life and work than to the special occupational risks. The increasing toll of accidents, in spite of laws and mechanical devices, can be met only by getting co-operation in preventive work among all the workers. The function of the school is discussed at length in this regard.—E. L. Sevringhaus.

INSEPARABLE SAFETY DEVICES. *Hans Hedrich.* Zentralbl. f. Gewerbehyg., Nov., 1921, 9, No. 11, 271-274.—Diagrams are shown of several safety devices which are designed to make the different types of presses, to which they are attached, inoperable if they are detached or are not used.—E. L. Sevringhaus.

A FATAL ACCIDENT FROM WELDING A BENZINE CONTAINER. *Morgner.* Zentralbl. f. Gewerbehyg., Sept., 1921, 9, No. 9, 211-212. —A metallic benzine container was sent in for repair of a leak. Welding with the acetylene flame caused an explosion with fatal result to the operator because the vapors of the benzine had not been completely removed from the tank. Difficulty in removing vapors of hydrocarbons is pointed out, and the methods recommended are discussed.—E. L. Sevringhaus.

FIREFOAM PROTECTION OF EXTRA-HAZARDOUS RISKS IN MANUFACTORIES. *D. M. Patterson.* Abstracted as follows from Chem. and Metall. Engin., 1921, Vol. 25, 887-888, by W. H. Boynton, in Chem. Abstr., Jan. 20, 1922, 16, No. 2, 304.—"In the dye-making, paint and varnish industries water has little value as protection against fire. An automatic Firefoam sprinkler system is effective. The system requires two solution tanks and two separate piping systems, one pipe to deliver $Al_2(SO_4)_3$ solution and the other $NaHCO_3$ solution containing Foamite. The foam produced upon contact of these two solutions has a volume eight times their combined volumes. Mixture is effected at the sprinkler head. The tank storing the acid solution must be of wood of special construction or of Pb-lined steel. The dry pipe system and ordinary piping are generally used to eliminate the necessity of Pb-lined pipe throughout and the system must be washed out with water after use. The valveless system used for small installations is illustrated. The solution tanks are filled 2/3 full of the solutions and air pressure built up to the pressure required to deliver the solutions to the heads. The same pressure is built up in the pipe lines through the check valves; these have a small orifice through them which compensates for minor leaks in the air pipes, but is too small to compensate when a sprinkler head is released. The result of this unbalanced pressure in the solution tanks starts the sprinklers."

SAFETY IN THE CALIFORNIA PETROLEUM INDUSTRY. *Roy W. Kelly.* Nat. Safety News, Jan., 1922, 5, No. 1, 13.—Owing to the fact that the majority of employees engaged in the oil industry are native-born or of native-born parentage, the problem of organized safety work is very simple.

The Associated Oil Company, which has a typical safety program, has a safety organization headed by a safety board consisting of: the general superintendent of producing fields, the manager of manufacturing, the chief engineer, the manager of the tax and claim department, and the manager of the industrial relations department. Local safety committees exist, both in producing fields and in the refineries, of representatives of workmen and of foremen.

The functions of the safety board are supervisory and executive. It originates plans and passes upon suggestions made by local committees. It secures data upon which to base its safety campaigns. In each of the eight large divisions of the company, the industrial relations department has an employment foreman who is responsible for the following matters: employment, inspection of housing and sanitation, investigation of grievances, safety, etc.

Records show the causes and number of accidents. Of these, the majority are due

to carelessness, inattention, or the wrong method of doing the work. In order to decrease the number of accidents, educational channels have been opened through mass meetings with lectures and motion pictures, bulletin boards with accompanying photographs, the establishment of a small library, and a "No Accident Week."—M. C. Hamblet.

CEMENT PLANT ACCIDENTS CUT 75 PER CENT. IN 1921 SAFETY DRIVES. *H. G. Jacobson.* Nat. Safety News, Feb., 1922, 5, No. 2, 21.—"During the past year the Bureau of Accident Prevention and Insurance of the Portland Cement Association has conducted safety campaigns at a number of its plants in the form of no-accident months. The purpose of these campaigns was to prove that, taking the plants in their present generally well guarded condition, about 75 per cent. of the accidents can be prevented by application of more efficient methods for selling the proposition to the men.

"Thirty-nine plants during various months of the year conducted these no-accident month campaigns with the result that, in comparison with the corresponding month of the previous year with approximately the same number of men employed during these months:

"The number of accidents was reduced from 155 to 45, or 70.9 per cent;

"Days lost were reduced from 2,205 to 504, or 77.1 per cent.;

"Deaths were reduced from 4 to 1, or 75 per cent."—M. C. Hamblet.

INDUSTRIAL SURGERY

UNDERGROUND DRESSING STATIONS. *R. R. Sayers.* Hosp. Management, Jan., 1922, 13, No. 1, 60, 62.—The construction, location and equipment of first-aid rooms in mines are dealt with in this article. A first-aid dressing station should be built with the possibility in mind of its being used as a refuge chamber, with doors and stoppings gas proof. It is sometimes possible to locate a station under a diamond drill hole or core drill hole extending to the surface. This will help to ventilate the chamber, serve as conduit for telephone and electric wires, and if the station is used as a refuge after a disaster, food and water can be lowered to the trapped miners through it.

The minimum equipment required in government leased mines is given. First-aid material should be kept in tight containers. In addition, a well-equipped first-aid cabinet, a woolen blanket, a water-proof blanket, a set of splints and a stretcher should be kept convenient to the live workings in each section of the mine.

Objections concerning the stealing and abuse of first-aid materials, the tendency to take an injured man to the station before caring for his injury in any way, and the fact that men having minor injuries dressed at the station feel that it is unnecessary to be treated by a physician, are answered.

MEDICAL AND MEDICAL-DEFENSE ASPECTS OF FRACTURES. *J. E. Tuckerman.* Ohio State Med. Jour., Nov. 1, 1921, 17, No. 11, 735.—Up to May, 1921, in forty instances out of 107 matters referred to the Ohio Medical Defense Committee, dissatisfaction arose from fractures. Fractures cause upwards of one-half the suits against physicians, and this accords with the experience of medical defense committees in other states. The keeping of case records is therefore important.

The various complications arising from fracture are commented on: the tendency of charity patients and those misrepresenting their economic status to be induced to enter suit more frequently than others; the physical condition of patients and complicating diseases; complicating infections; pain; and concealed fractures. The value of the radiograph record taken before and after setting, the limitations of the radiograph record, and the restoration of function are also discussed.—G. E. Partridge.

FRACTURED FEMURS. *C. E. Early.* Calif. State Jour. Med., Dec., 1921, 19, No. 12, 474-477.—The author concludes with the following summary:

"1. Fracture of the femur is a serious process, both in its immediate aspect and its

possibility of permanent impairment of the artisan's function.

"2. The Whitman and Thomas splint methods bring almost perfect results if properly applied. The medical profession was slow to take them up but the great war, and later experiences in industrial surgery, proved their efficiency.

"3. Every case should be painstakingly watched. Daily inspection and frequent X-ray examinations are as essential as the proper application of the method chosen for treatment.

"4. The mobility of the knee should be carefully guarded both by free, passive, and active movements and massage.

"I have purposely not entered into the discussion of compounded fractures of this bone, because the essentials of treatment are the same as in uncomplicated cases, save for the proper management of the soft parts and any ensuing infection. This would open up the field of the treatment of wounds and infections and would really not in any way be tantamount to the essential process considered here—the treatment of fractured femurs."—M. C. Shorley.

INDUSTRIAL PHYSIOLOGY: NUTRITION, METABOLISM, FATIGUE, ETC.

Second Annual Report of the Industrial Fatigue Research Board to September 30, 1921. H. M. Stationery Office, London, 1922. pp. 65.—This report on the work accomplished by the Industrial Fatigue Research Board is one of unusual interest since it contains an admirable analysis which sets forth how the facts established in the various reports which have been issued fit into the whole study of human activity.

The report first details the means of measurement used in the different investigations —output, labor turnover, sickness and mortality, lost-time and accidents—and then proceeds to narrate how they have been applied in many industries, such as the manufacture of munitions of war; boot making; textile spinning and weaving; the manufacture of iron, steel, and tinplates; metal polishing; and foundry work.

This report shows how coherent has been the work, and how immense advances have been made in this new science, the study of the human factor in industry. Regularity of output from hour to hour, from spell to spell, and from day to day, is found to mark high efficiency and sound physiological environment; this follows from the conclusion that output is controlled by two opposing factors: (*a*) increased efficiency due to practice, which causes a rise in output; and (*b*) fatigue effects, which accumulate during the course of the spell, of the day, or of the week, and tend to bring about a gradual fall in output. Whatever postpones fatigue effects permits full play of efficiency due to practice. Rest-pauses, organized to suit different processes, are found useful to this end. Attention to the personal rhythm of the workers produces important results. Ventilation planned on physiological lines is shown to be of great value and to be practicable. Optimum temperatures for different classes of work are established. The influence of illumination is displayed. The effects of reducing and of lengthening hours of work have been fully prospected. The influence of the human and of the mechanical factors on work are established. Vocational selection and motion study have received attention; and in relation to the latter the new work referred to promises to revolutionize previous methods and ideas.

Throughout the report appeal is made to statistics and to excellent diagrams in support of the conclusions arrived at. The whole is, however, so condensed that no adequate summary can be presented. The document is indeed quite different from ordinary reports, and resembles rather a well and carefully written textbook, to which everyone interested in the subject of industrial hygiene must turn for information and advice.

The machinery and organization for carrying on the research during the year underwent reconstruction, necessitated by the stern need for economy. Opportunity was at the same time taken to widen the terms

of reference to the Board, so that in future the scope of activities may cover all sides of human industrial activity.—E. L. Collis.

INDUSTRIAL FATIGUE IN CHEMICAL WORKS. *E. F. Armstrong.* Jour. Soc. Chem. Indust., Jan. 16, 1922, 41, No. 1, 2-3R.—A brief general article to the effect that labor in chemical plants is confronted with work requiring a greater degree of intelligence and of a less monotonous type than the ordinary piecework met with in general manufacturing. Shorter hours of labor and the general disinclination of the worker to exert himself make the problem of industrial fatigue of minor importance.—Philip Drinker.

THE PROBLEM OF INDUSTRIAL FATIGUE IN INDIA. *Gladys M. Broughton.* Jour. Indian Indust. and Labour, Nov., 1921, Vol. 1, Part 4.—This article is a good summary of the work which has been done in England. Interest is attached to its appearance in India and to an appeal which the author makes for similar work to be undertaken in that country. She asks for records to be kept of output, sickness, labor turnover, and accidents for purposes of subsequent scientific analysis and study. India presents its own problems; industrialism is young; there is no hereditary industrial class and labor is almost entirely recruited from the ranks of agricultural workers. Hence, unique opportunities exist for watching and investigating the effect of industrial development, and for guiding it, as it has not been guided elsewhere, from small beginnings on hygienic lines.—E. L. Collis.

INDUSTRIAL SANITATION: FACTORY CONSTRUCTION, ILLUMINATION, VENTILATION, HEATING, WATER SUPPLY, SEWAGE DISPOSAL

THE REPORT OF THE COMMITTEE (BRITISH) ON SMOKE AND NOXIOUS VAPOURS ABATEMENT. *J. B. Cohen.* Jour. Soc. Chem. Indust., Jan. 16, 1922, 41, No. 1, 1-2R.—A review of the report of the above committee.—Philip Drinker.

SECOND REPORT OF THE DEPARTMENTAL (HOME OFFICE) COMMITTEE ON LIGHTING IN FACTORIES AND WORKSHOPS. Illuminating Engineer, Oct., 1921, 14, No. 8, 192.—This committee was appointed in 1913, issued its first report in 1915, and resumed work after the war in 1920. The second report which has now been issued deals chiefly with: (1) glare; (2) shadow; (3) constancy. In the first report glare was defined as resulting from: (1) the effect of looking directly at a bright source of light; (2) the annoyance caused by the presence of a bright source of light towards the edge of the field of vision; (3) the result of looking at polished surfaces. The first essential is the proper shading of the light sources, and in this connection the committee makes the following recommendations:

1. *Glare.*—"(A) . . . . Every light source (except one of low brightness) within a distance of 100 feet from any person employed shall be so shaded from such person that no part of the filament, mantle or flame is distinguishable through the shade, unless it be so placed that the angle between the line from the eye to an unshaded part of a source and a horizontal plane is not less than 20 degrees, or in the case of any person employed at a distance of 6 feet or less from the source, not less than 30 degrees."

"(B) . . . . Adequate means shall be taken, either by suitable placing or screening of the light sources, or by some other effective method, to prevent direct reflection of the light from a smooth or polished surface into the eyes of the worker."

2. *Shadow.*—"(C) . . . . Adequate means shall be taken to prevent the formation of shadows which interfere with the safety or efficiency of any person employed."

3. *Constancy.*—"(D) . . . . No light sources which flicker or undergo abrupt changes in candlepower in such a manner as to interfere with the safety or efficiency of any person employed shall be used for the illumination of a factory or workshop."

"(E) . . . . That as regards existing installations a reasonable time limit should be given before the above requirements become operative."—T. L. Llewellyn.

INDUSTRIAL LIGHTING. SOME NOTES ON THE ANNUAL REPORT OF H. M. CHIEF INSPECTOR OF FACTORIES FOR 1920. Illuminating Engineer, Nov., 1921, 14, No. 9, 213.—Attention is called to the Welfare Pamphlet No. 7 on "Lighting in Factories and Workshops." One of the worst features is the neglect of natural lighting; broken panes are not repaired but are stuffed with rags, windows are allowed to become covered with dust or obscured with paint. Thick dulled glass reduces illumination, is difficult to keep clean and gives a dreary lighting effect.

In a sub-report on arc welding, Dr. Bridge gives an account of the inflammation which results from an exposure lasting only a few seconds. Dr. Bridge has not found permanent injury resulting, but cases of keratitis have been reported by other observers. The inflammation usually begins four hours after exposure and subsides within twenty-four to forty-eight hours.

Sir J. H. Parsons gives a summary of the report of the Glassworkers' Cataract Committee. Although repeated and prolonged exposure to ultraviolet rays produces changes in the lens, the conclusion of the committee is that the active agent in inducing the cataract among glassworkers is exposure to heat energy. With the use of the proper type of "Crookes" glass the disease would be abolished.—T. L. Llewellyn.

INDUSTRIAL HEALTH LEGISLATION: COURT DECISIONS: WORKMEN'S COMPENSATION AND INSURANCE

NEW YORK STATE MISCELLANEOUS LABOR LAWS WITH AMENDMENTS, ADDITIONS AND ANNOTATIONS TO NOVEMBER 1, 1921. N. Y. State Dept. Labor, Indust. Commission, 1921, pp. 163.—"This pamphlet embraces provisions of the laws of New York which directly or indirectly affect labor, other than the Labor Law and the Workmen's Compensation Law. The text is taken, for the most part, from the Consolidated Laws of 1909 with amendments up to and including the year 1921. Some provisions are taken from the Civil Practice Act and from the Code of Criminal Procedure. A few are special or local acts. Specific reference is given in all cases to amendments."—M. Dent.

METHODS OF ADJUSTMENT IN INDUSTRIAL DISPUTES IN GERMANY. Internat. Labour Rev., Jan., 1922, 5, No. 1, 51-65.—A detailed history of legislation and the work of courts and boards governing industrial relations is given. The agencies of adjustment are of two kinds, those set up by law, and those created by collective agreement. The statutory authorities for the adjustment of disputes include the ordinary and special adjustment boards, the Demobilization Commissioners and the industrial and commercial courts, the guild boards, and seamen's boards. The organization and the procedure of these boards is given.

In 1919 there were, in Germany, 264 local adjustment boards. The total number of disputes brought before them was 84,846, somewhat more than half being individual disputes, a type that was intended to go before these boards only until the labor courts were set up. Of the total number of disputes, conciliation was successful in 35 per cent.; arbitration in 36 per cent.; and simple mediation without oral proceedings in 28 per cent.

Figures are given also for the disputes taken over by the Federal Ministry of Labor for settlement.

A new Labor Disputes Code was submitted to the Federal Economic Council in November, 1920, and approved in December, 1921.—G. E. Partridge.

DRAFT CONVENTIONS. Internat. Labour Office, Official Bull., Nov. 23, 1921, 4, No. 21, 446-447.—In Bulgaria the duration of work is now regulated by the Decree of 1919. This goes beyond the Draft Convention, in including commercial enterprises. The Draft Convention admits exceptions, but, on the other hand, it offers advantages for the application of the eight-hour day to every class of industry. The operation of the Draft Convention will be delayed in Bulgaria probably until July, 1924.

In regard to night work of women and young persons, the present Bulgarian law is

much more comprehensive than the two Draft Conventions. Section 18 applies both to commercial and transport occupations and allows no exceptions in the case of persons from 16 to 18 years. The exceptions provided in regard to the night work of women are more appropriate than those of the Draft Convention. Exceptions are made in the case of work especially suitable for women, and exceptions are allowed for women after 5 A. M. or 6 A. M. and after 8 or 9 P. M. in such a way as to allow for two shifts daily.

Bulgarian legislation has been directed toward forming a system of legal protection of women during pregnancy. By the terms of the law already in force, women are entitled to a period of eight weeks' rest before and after confinement (one to four weeks before and one to four weeks after). The working mother receives half the amount of her wages. The nursing mother is entitled to two hours' absence from work on Saturdays for a period of six months without wage reduction. The Insurance Act has modified this, and the woman receives a benefit from the workers' insurance fund. There will be no difficulty in ratifying the Convention, since the differences between this and the law now in force are slight.—G. E. Partridge.

UNEMPLOYMENT COMPENSATION AN AID TO ECONOMIC SECURITY. *Seebohm Rowntree.* Am. Labor Legis. Rev., Dec., 1921, 11, No. 4, 295-298.—The menace of unemployment is a serious evil, and it is the duty of the community to take every step to steady the labor market and to provide work for the unemployed. But when all has been done there still remains a margin of unemployed which probably amounts, in a series of years, to about 5 per cent. Industry should make some adequate provision for this margin when it cannot be absorbed. Industry should pay enough to prevent serious privation for the involuntarily unemployed, and thus remove from workers the practical menace of their liability to unemployment. Unemployment insurance can be organized either by the state, or by individual factories or groups of factories. It is probably desirable that the worker should bear a share of the loss from unemployment, and also that the community as a whole should contribute, as is provided in Britain by the National Unemployment Insurance Act. "The fear of unemployment and the sense of injustice associated with this fear in the minds of the workers are two of the most potent causes of labor unrest, and a measure which would remove them would have a unique effect in dispelling that unrest."—G. E. Partridge.

INDUSTRIAL ACCIDENT INSURANCE. Am. Labor Legis. Rev., Dec., 1921, 11, No. 4, 351-368.—This is a summary of state legislation in the United States in 1921, relating to employers' liability and workmen's compensation (including under the latter new acts, acts supplementary to existing laws and vocational rehabilitation).

Two states — Oregon and Texas — have passed acts concerning employers' liability. Missouri has passed a new workmen's compensation act to take the place of one repealed by referendum. About half the states have passed supplementary acts during the year, and about as many have passed some act in regard to vocational rehabilitation. New Hampshire has provided for an unpaid commission to investigate and make recommendations for improving employers' liability and workmen's compensation laws, and North Carolina has made a small appropriation for a similar commission. There is a federal act providing additional hospital and dispensary facilities for the treatment of war cases under the bureau of war risk insurance.—G. E. Partridge.

INDUSTRIAL INSURANCE, MEDICAL AID AND SAFETY ACTS. Washington State Dept. of Labor and Industries, Olympia, Wash., 1921, pp. 158.—This pamphlet sets forth the laws of the state of Washington, enacted and amended to 1921, covering industrial insurance, medical aid in industry, safety acts applying to those establishments under the jurisdiction of the Industrial Insurance Department, together with the administrative code, rules for electrical construction, and inspection of public utilities, and laws relating to the education and marketing of the industrial products of the adult blind.—M. Dent.

REHABILITATION OF DISABLED EMPLOYEES

On Behalf of the Industrial Disabled. *Gerald A. Boate.* Indust. Management, Dec., 1921, 62, No. 6, 345-352.—Industrial training and technical education have received world wide attention during the past four years, and "the disabled ex-service man has spread the gospel of vocational education into the most remote corners of America." The need is now for a clearing house of information, and for "standard practice instructions," drawn up by competent observers.

How may a disabled person be fitted for a position in industry or commerce which will be free from working conditions that will aggravate the disability, and so that he may work with others who are not handicapped? The answer is, by adequate training. The period of training will vary with the occupation, but usually it will not exceed eighteen months for grades below professional. This training must be so well given that the school can demand a market for its product, and the candidate need not apologize for having passed through a vocational school.

In the analysis of occupations for the reabsorption of the disabled, the equipment, the content of courses, the work produced and the working conditions in the school, "it is well to work back from industry, making the atmosphere of the school and its shops as nearly like the factory as possible. Firmness and justice and a square deal are much more appreciated than kindness, sympathy and laxity." A minimum course should be carefully analyzed out, records should be kept of everyone under training, results charted and desirable standards of achievements set up. The object is to complete training for an industry. Only when the man becomes competent and enters a vocation where progress is satisfactory to all concerned should oversight be relaxed, and only then should the employer be expected to pay the full wage to the re-trained disabled man. Even after this there should still be follow-up work by those fitted to become judges or arbitrators.

A list of 314 occupations is given, comprising occupations that have been chosen by disabled ex-soldiers and a sample of analysis of occupation is offered in the form of a diagram showing the usual organization of three types of pattern making and the grade of technical skill required in each department. A detailed analysis is worked out for some of the processes, and there is an outline for guidance in the scientific selecting of suitable occupations for disabled men.—G. E. Partridge.

Clinical Experience as to the Several Kinds of Physiotherapy Employed in Reconstruction Work. *James T. Watkins.* Calif. State Jour. Med., Dec., 1921, 19, No. 12, 471-474.—Dr. Watkins reviews briefly the value of the more generally employed physical therapeutic agents—namely, massage; manipulation; hydrotherapy; thermotherapy; electrotherapy; and mechanotherapy.—M. C. Shorley.

The Development of a Modern Medical Service for the Industrial Injured and Sick at the Hahnemann Hospital of the University of California. *Edgar L. Gilcreest.* Calif. State Jour. Med., Dec., 1921, 19, No. 12, 462-464.—The University of California in its industrial hospital, the Hahnemann Hospital, is attempting to furnish a complete service for the industrial injured. There are maintained departments of physiotherapy, occupational therapy, and social service.

Nine specially trained technicians treat daily about seventy cases in the physiotherapeutic department. Emphasis is laid upon the operation of trained attendants rather than upon the use of elaborate machines. All patients are treated under the supervision of a physician, and efforts are made to familiarize physicians, who send patients to physiotherapy, with the functions of the department by requiring that patients be treated only upon the prescription from the attending physician and that the attending physician see each case frequently in conference with the physiotherapy worker. The technicians should have attractive personalities, and should be sympathetic and encouraging. This functional re-education is best carried out in a clinic. The psychic effect upon the patient of receiving treatment together with others suffering from similar disabilities is excellent.

The occupational therapy department covers the function of bedside occupation and

light occupation for the average convalescent. Occupational therapy is of value to both the patient's mind and body, and is of great assistance to both the physician and the nurse. The difficulties encountered in occupational therapy are:

"1. The adult mind does not learn easily, especially after long years of mental inactivity.

"2. Getting started with a patient is in many cases a slow process, requiring much tact and patience.

"3. It is not easy for him to realize the therapeutic value of work.

"4. The ambitionless type is difficult to stimulate."

The social service department performs one of the most important phases of industrial rehabilitation, namely, that of aiding the disabled workman to believe in himself and in his own ability to become industrially independent again.

An outpatient department is maintained especially for the benefit of men who have been convalescing in the hospital for a long time and are still in need of physiotherapy. These men are placed in supervised homes nearby as soon as it is safe for them to leave the hospital, but they return to the hospital for meals. In this way they are kept in a healthful atmosphere and yet do not become hospitalized or dependent.—M. C. Shorley.

RETURN TO WORK AFTER INJURY. *Morton R. Gibbons.* Calif. State Jour. Med., Dec., 1921, 19, No. 12, 458-459.—It is Dr. Gibbons' opinion that treatment of the injured should involve as slight departure from normal in habits and environment as is compatible with proper technical treatment. He believes that no one is normally entitled to idleness because he has been hurt, but that every injured person is morally entitled to earn whatever he can with whatever function he possesses. Work-treatment after injury can be ideally carried on in a large industrial plant which maintains its own dispensary and medical department. The surgeon can make inspection of the work environment of the injured under his treatment and, being familiar with the situation, can prescribe work and see that it is carried out without abuse. The vast numbers of persons injured in small plants are not so easily disposed of, however. In such cases, the insurance companies could, by a system of merit rating, or some similar system, arrange for work for the convalescent in the plants in which they were injured. The alternative for this is workshops connected with hospitals—an arrangement which presents many difficulties, among them the disposal of the product, if the injured man is to be paid for his work.

The points which Dr. Gibbons emphasizes in particular are:

"That injury is not to entail idleness.

"Work is to be provided with full pay.

"Work in the plant where injured, under supervision of the plant physician, is good.

"Work provided by hospital, school, farm, etc., is preferable to idleness.

"Pay must be the same as when injured."
—M. C. Shorley.

ABSTRACT OF THE LITERATURE

OF

INDUSTRIAL HYGIENE

VOLUME IV JULY, 1922 NUMBER 3

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GENERAL

PROBLEMS OF INDUSTRIAL HYGIENE IN RELATION TO PUBLIC HEALTH. *Thomas Oliver.* —This paper, a lecture delivered in the Royal Institute of Public Health, states that problems of industrial hygiene, which first received serious attention in Great Britain, achieved less than the anticipated results, owing to lack of organization. The following points are emphasized by Dr. Oliver:

1. Industrial medicine must be both preventive and curative.

2. Vocational guidance is essential.

3. Men resuming work, after an absence due to accident or illness, should be given either light employment or shorter hours.

4. "The essence of life is work," and appropriate employment ought to be provided for the partially fit as well as for the fully fit; for women as well as for men.

5. Woman's arena of usefulness is the home, and her sphere of influence the family; yet it is necessary to safeguard the married woman who earns her living, and especially the expectant mother.

Professor Oliver also draws attention to the great advantage of the Safety Bonus System, by which a foreman receives a substantial bonus if the frequency of accidents is reduced below a certain standard — the bonus to increase in inverse proportion to the number of accidents. He does not, however, point to the practical danger of so-called trivial accidents not being reported. More working hours are unnecessarily wasted by trivial accidents than from any other cause—*e.g.*, the cut finger becoming septic on account of neglect. To make this scheme effective a severe penalty should be inflicted

for failure to report accidents. Unfortunately, however, it is difficult to compel compliance with the rule of notification or to enforce a penalty for its infringement. This contention is borne out by Dr. Oliver's admission that "the severity rates were slightly higher in the bonus factories than in the non-bonus factories."—D. A. Coles.

FACTORY INSPECTION IN AUSTRIA IN 1919. Internat. Labour Rev., Jan., 1922, 5, No. 1, 151-157.—It is reported that factory inspection work in Austria was exceptionally heavy in 1919, on account of retrogression during the War. There was a decrease in the number of accidents reported during the year, and cases of occupational diseases were fewer than usual. Some of the difficulties met in making changes to the eight-hour plan and also in returning to required standards after the lax practices during the War are mentioned. A point of general interest is the recommendation made by the chief inspector condemning the general practice of referring accidents without inquiry to the worker's own fault in cases where injury might have been averted by certain precautions, since fatigue may render a worker incapable of proper care, and in such a case he cannot be held negligent.—G. E. Partridge.

FACTORY INSPECTION IN BELGIUM. Internat. Labour Rev., Jan., 1922, 5, No. 1, 157-162.—In Belgium the factory inspection staff was twice as large in 1920 as during the pre-war period. Many small workshops were brought under inspection in 1919, as the act relating to the employment of women and children covered their employment everywhere except in family undertakings not regarded as dangerous to life or limb. Attempts to enforce labor laws have been impeded by the conditions brought on by the War, and the inspectors report that the War has practically blotted out the work of the last twenty years.—G. E. Partridge.

LABOUR CONDITIONS IN JAPANESE COAL MINES. Internat. Labour Rev., Feb., 1922, 5, No. 2, 251-264.—Coal miners form approximately 12 per cent. of the industrial population of Japan. The industry has developed rapidly since 1908, the number of workers employed in that year being 126,999 as compared with 348,240 in 1919.

The provisions governing working conditions, as laid down in the Regulations issued by the Department of Agriculture and Commerce in August, 1916, apply only to employees who are holders of permanent mining rights, and relate almost entirely to women and children. The employment of children under 12 years is forbidden, as is also the employment of women and of children under 15 years for more than twelve hours per day. No woman or child is allowed to work between the hours of 10 and 4 during the night, except on a shift, and then only provided the shift is changed periodically, the period not to exceed ten days. A thirty-minute rest period must be given to all women and children in a day longer than six hours, and a one-hour rest period in a day longer than ten hours. Two rest days per month are compulsory for women and children under 14 years, and four rest days per month when night shifts are worked.

Conditions of work for adult men are scarcely mentioned in the Regulations. Each miner is, however, required to submit for the approval of the chief of the Mining Board in his district such rules as he has adopted for the employment of workers in his mines. The condition of adult workers is, on the whole, better than might be inferred from this Regulation. The men are employed generally on two shifts of ten hours each per day, although some miners have introduced the eight-hour day with two or three shifts. Approximately the same rest periods are allowed as are provided for women and children.

Provisions are made for accident and sickness compensation, and each employer must draw up his own rules in accordance with these provisions and must then submit them for approval before commencing mining operations.

The Regulation concerning the Employment and Relief of Miners prohibits the employment of persons suffering from certain diseases likely to affect the health of other workers or likely to be aggravated by the

work on which they are engaged. It also contains provisions concerning the employment of women and children in unhealthy processes, and prohibits the employment of women within thirty-five days after childbirth, excepting in instances where the work is of a nature which the doctor pronounces to be harmless; and then the rule does not apply after twenty-one days.

The Japanese Bureau of Mines has been studying the provisions for sanitation in mines, the construction of workshops and dwelling houses in mining districts, the examination of drinking water, the analysis of the atmosphere in mines, and other such details, and plans to appoint a commission to introduce improvements and to lay down the provisions which the mine owners should adopt.

In all the larger mines, employers have established medical institutions for the benefit of their workers. In 1919, there were 171 mines throughout the country, each with its own medical bureau, and doctors in the ratio of one to 595 workers. In the mines with no such medical bureau, arrangements were made with the local doctor.—M. C. Shorley.

PREVENTION OF ILLNESS AMONG MINERS. *R. B. Sayers.* U. S. Bur. Mines, Reports of Investigations, Serial No. 2319, Feb., 1922.—During the years 1920 and 1921 much work has been done on carbon monoxide. Forbes reports against occurrence of late after-symptoms from acute gassing (except in rare instances) unless there is a pre-existing pathological condition; he does not find cumulative harmful effects from frequent exposure. Experiments on animals do not show change in the coagulation time of the blood.

An investigation made by Henderson, Fieldner and Sayers (made especially to determine conditions for ventilation of the proposed New York-New Jersey tunnel) has given some new results. Several new methods have been developed, such as the iodine pentoxide method for the determination of carbon monoxide in air; collection and preservation of blood samples for carbon monoxide determination from persons overcome or affected by the gas; methods for the analysis of carbon monoxide in the blood. Henderson formulated a statement of the probable effects of different concentrations of the gas, as follows: When time of exposure in hours times the concentration of carbon monoxide in parts per 10,000 equals 3, there is no perceptible effect. When the result is 6 there is a just perceptible effect. When the result is 9, there will be headache and nausea. When the result is 15 or more, the effects are dangerous. The lack of poisonous effects of carbon monoxide on nerve tissue was demonstrated by exposing growing embryonic chick brain tissue to a high concentration of carbon monoxide. High temperature and high relative humidity have been shown to increase the rate of absorption of carbon monoxide by the blood owing to the increased frequency and rate of respiration, etc. In the treatment of carbon monoxide asphyxia, Henderson and Haggard advise the use of pure oxygen containing from 6 to 10 per cent. of carbon dioxide, but Sayers, O'Brien and Yant were unable to obtain such striking differences between the oxygen treatment and the carbon dioxide, and they decided that the method recommended was not suitable for use by first-aid men, but that oxygen should be available since the first few minutes after exposure to large quantities of carbon monoxide are the most important in the treatment. Lewin recommends bleeding in connection with use of oxygen, but American investigators advise against it. For the detection of carbon monoxide in air there are two comparatively recent methods which are described. A new gas mask is explained.

Some new findings in regard to carbon dioxide in air are reported; the conclusion being that, while it is possible to breathe 9 and 10 per cent. of carbon dioxide in oxygen, any percentage above 5 will cause noticeable effects, and between 2 and 2½ per cent. is all that should be permitted in the inspired air of an oxygen breathing apparatus at any time.

Prevention of miners' phthisis and tuberculosis is another subject on which there is new information. Orenstein and Ireland in South Africa have reached the following conclusions: (1) Dust is not alone the cause

of phthisis. (2) Ventilation does not increase the harmful dust conditions. (3) Exhausting air through the pipes from drives and winzes is much better than forcing air in through similar pipes. (4) Measurement of air currents and notes of any changes in velocity and direction in every section are absolutely necessary. (5) Air in stopes should be induced to flow along the face and not back in the open waste. (6) While eddies caused by local circulation may be helpful, such circulation can only be helpful for a limited time and as a temporary measure.

Ferguson concludes also that "the question of ventilation has more important bearing on the elimination of dust than has previously been recognized," and he recommends frequent examination of workers and elimination of those affected with silicosis. It is pointed out that both wet and dry drills may be dangerous. Warren has described a device for collecting the dust from drills, but states that "the real source of dust production is that caused by firing holes." He shows that promiscuous firing should never be permitted but a water blast that has a large air consumption is to be preferred, and should be used in the direction of ventilating currents. Harrington has emphasized the value of dust abatement by better ventilation.

Sayers and Harrington have studied the effects of high temperature and humidity in mines. It was found that, if the air temperature is above 75° F. and the relative humidity high, the efficiency and comfort of the worker are materially increased by air movement. An exhaustive study of the science of ventilation has been published by Hill. The U. S. Bureau of Mines, the U. S. Public Health Service, the American Society of Heating and Ventilating Engineers, the National Research Council and co-operating universities are now engaged in extensive laboratory studies to try to formulate definite standards of temperature, humidity, and air movement in order to maintain the health, efficiency, and comfort of workers. —G. E. Partridge.

THE THIRD INTERNATIONAL LABOUR CONFERENCE: COMMISSION ON WHITE LEAD. Internat. Labour Rev., Feb., 1922, 5, No. 2, 193-195.—This report states briefly the work of the commission and the subcommissions which were appointed to investigate for the Third International Labour Conference the subject of the prohibition of the use of white lead in painting. The commission finally decided in favor of regulation, but by a very narrow majority. The majority recommended a Draft Convention; the minority formulated no definite decision, but contented themselves with a protestation in favor of prohibition.

"The Draft Convention finally adopted without opposition prohibits in a general way the use of white lead paints in interior work, but permits their use, under regulation, for outdoor operations. The superiority of white lead paints in the presence of fumes is apparently conceded since their use is permitted in the interior painting of railway stations and industrial establishments in which, in the opinion of the government delegates or experts, their use is necessary. Artistic painting and fine-lining are also excepted. On the other hand the employment, even in exterior work, of all women and of young persons under eighteen years of age is forbidden, except in the case of apprentices, for whom some elasticity is permissible in the interest of their trade education.

"A further Article of the Convention aims at securing statistics of morbidity and mortality in connection with lead poisoning among working painters. The Convention would become effective at the earliest in 1927.

"This Convention, like most legislation and most collective agreements, is a compromise, but if adopted it will represent a marked advance in industrial sanitary regulation, and, since its coming into operation is postponed for six years, there seems to be no reason why this advance should not be secured without serious disorganization of either the industry engaged in the production of the raw material or in that which utilizes the finished product. In any case, the human factor should stand first: the disadvantages of lead poisoning must be weighed against the evils of possible temporary unemployment in the lead paint industries."—M. C. Shorley.

DUST HAZARDS AND THEIR EFFECTS

ON THE ROENTGEN PICTURE OF PNEUMOKONIOSIS, ESPECIALLY IN ITS DENSEST FORM. *W. Jaensch.* Abstracted as follows from Fortschr. a. d. Geb. d. Röntgenstrahlen, 1921, Vol. 28, 299, in Med. Science, Feb., 1922, 5, No. 5, 455.—"The object of the writer of this article is to show the differentiation between pneumokoniosis and ordinary tuberculosis, for the clinical symptoms in both forms of disease resemble each other closely. One point of distinction he gives is that in pneumokoniosis it is seldom that the apex of the lung is affected, the disease mostly affecting the underlying parts of the upper lobe of the lung. It is, according to the Roentgen picture, more evenly distributed over both halves of the lungs than in advanced tuberculosis. Also dyspnoea may be marked in pneumokoniosis, whereas even in very advanced tuberculosis it is mostly absent. The tuberculin reaction is negative.

"According to the Roentgen photographic demonstrations, the shadow pictures differentiate between miliary tuberculosis and pneumokoniosis by the variation in the size of the shadow groups, leaving the apex almost free. Anthracosis and chalicosis reveal wider and more irregular patches.

"In a series of photographs the author shows the varied forms of lung patches caused by the different types of lung troubles, namely, syphilitic pneumonia, pneumokoniosis, etc., and lung affections caused by iron dust inhalations."

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

TYPE AND ENVIRONMENT OF EMPLOYMENT AS FACTORS IN THE EXPECTANCY OF LIFE OF THE WORKING CLASS CONSUMPTIVE. *R. C. Wingfield.* Am. Rev. Tuberc., March, 1922, 6, No. 1, 69-73.—"If the standard we have taken is a fair one, these different groups, judged by it, show that the type and environment of a patient's work have but little influence on his expectancy of life. But tables 3 and 4 show that the careful choice of work does slightly increase his chance of survival by a small percentage; and the results of table 3 c. support this conclusion in a definite manner, and further lead us to think that a more detailed investigation in a larger number of cases, if properly interpreted, might even show a 10 per cent. increased expectancy of life.

"Finally, we should here call attention to table 3 b, which gives the worst result, indicating that an adult male, changing to physical work from nonphysical work, will probably be leaving skilled for unskilled work, which apart from anything else means a smaller wage. Further, there is the worry of learning and acquiring speed, that is, manual dexterity, which comes hard to any adult and harder still to a man past middle age. Worry is an important factor in tuberculosis, and may easily counterbalance the good effects of better working conditions."—M. C. Shorley.

TUBERCULOSIS IN RELATION TO INDUSTRY. *S. Lyle Cummins.* Jour. State Med., Jan., 1922, 30, No. 1, 4-14.—"If it is true that a large proportion of the tuberculosis mortality amongst male adults under industrial conditions is due rather to the awakening of old infections than to the inception of new disease through fresh infection, it is clear that this has a bearing on the employment of persons suffering from the disease in a chronic form consistent with fair health and average working capacity. If we were to take the view that such persons constitute a grave danger to their fellows under industrial conditions, we should be obliged, I think, as a nation, to face the question of their maintenance and to back up legislation for giving industrial grants to men withdrawn from their work in the interests of the community. Such legislation would be enormously costly, and would deprive many men of the privilege of fending for themselves while their physical condition permitted them to do so. My own view is that we must, with regard to the prevention of industrial tuberculosis, consider occupations as coming under two headings:

(1) Those in which infection plays a relatively small part; and (2) Those in which there is reason to think that it may play a very important part.

"In the first category I should place those industries where males are the chief employees and where there is no special element associated with the work which is calculated to facilitate infection.

"For practical purposes this category includes all our industries save those where there is danger of pneumoconiosis. In this category tuberculosis is, for practical purposes, an environmental rather than an infective disease. Our lines of prophylaxis should be directed to securing the best working and home conditions for those concerned, so that the stress of hardship, poverty, anxiety, and bad sanitation, in short, the bad physiological conditions so likely to lead to recrudescence of old infection, shall be lessened or avoided. In the second category I feel bound to place all occupations involving exposure to dangerous dusts. Here, although there is reason to think that the irritant particles frequently act by awakening old infections, there is also much evidence suggesting that re-infection, or fresh infection, is facilitated by the existence of silicosis. The example of South Africa is clearly a good one to follow, and the experience there leads the sanitary authorities to take every possible step to exclude infective cases from the mines. In this category, too, come, for a different reason, the young female industrial workers who quit domestic life shortly after adolescence to take up employment under factory and workshop conditions. The example of the female munition workers from 1917 to 1919 points clearly to the conclusion that here we have to deal with a group of people very little protected by acquired resistance, and, therefore, extremely liable to infection with the tubercle bacillus. Careful medical inspection and exclusion of infective cases is imperatively necessary in the interests of these women workers. Finally there is the question of the human beings who are most susceptible of all—the new arrivals in our industrial communities; children whose resistance is as yet very little developed. To my mind the urgent importance of legislation to exclude infective teachers from our schools is too often forgotten."—Barnett Cohen.

OCCURRENCE AND PREVENTION OF INDUSTRIAL ACCIDENTS

MAKING GAS—AND THINKING SAFETY. *H. Blackburn Harte.* Nat. Safety News, Feb., 1922, 5, No. 2, 5-9.—The importance of getting their men to think safety in gas plants has been recognized by large corporations. The following are the safety measures which have been put into practice in The People's Gas Light and Coke Company of Chicago.

1. Most important of all is an "automatically timed controlling device which makes it impossible to open or close the gas generator valves in improper sequence, thus preventing explosions which might occur from so doing."

2. The installation of a heavy iron bar, one end of which is fastened in the steel floor and the other end of which is hooked onto the spokes of the hand wheel by which the valve gears are turned, has eliminated both the crushed hand and explosion hazards in the operation of the "hot valve" or "down-run valve" which is used for changing the direction of the flow of steam through the fire.

3. A system of fire apparatus—high pressure steam lines with hose connections—has been installed; also waterhose connections; large and small chemical extinguishers; water hand extinguishers; and fire alarm boxes.

4. Fire drills are held monthly.

5. The "No Smoking" rule is rigidly enforced.

6. A system of red and white lights informs the firemen of the amount of water in boilers.

7. The plant manufacturing benzol, toluol, and solvent naphtha is isolated.

8. Every employee must understand the prone pressure method of resuscitation and be qualified in administering it.

9. Building materials are fire-resisting; all glass is wire-glass; electric switches are located on the outside of the buildings and

are enclosed in boxes.

10. Life belts are used for men working in street vaults.

THE ELECTRIC FLASH LAMP AS A SAFETY DEVICE. *L. C. Ilsley.* Nat. Safety News, Feb., 1922, 5, No. 2, 37.—The electric flash lamp—on account of its low voltage, together with a certain measure of protection for the bulb, due to the battery case and bull's-eye lens—is one of the safest types of lamps commercially available for use in the vicinity of gasoline storage tanks, garages, or automobiles.

A method for increasing the degree of safety of flash lamps is suggested by the use of a safety device so designed as to project the bulb from the circuit, should the bulb glass be broken and the glowing filament bared.—M. C. Hamblet.

VENTILATION—A SAFETY FACTOR. *C. Lorimer Colburn.* Nat. Safety News, Feb., 1922, 5, No. 2, 36.—"A mine operator has not done everything in his power to make his mine safe if he has neglected to install a positive system of ventilation, for it is not safe to depend on atmospheric conditions for mine ventilation." The entire article is a plea for positive ventilation in mines.

HEAT, COLD AND HUMIDITY

THE INFLUENCE OF DRAFTS ON BODY TEMPERATURE. *B. Lange.* Abstracted from Ztschr. f. Hyg., Vol. 91, p. 473 in Hyg. Rundschau, Dec. 1, 1921, 31, No. 23, 705.—Experiments were made in a large closed room. The subjects sat 2 m. in front of an electrically driven ventilator. From minute to minute thermoelectric measurements of the skin temperature were taken from the forehead, neck, and chest, and recorded graphically.

Even in a calm the subjects differed according to age, development, and nutrition. The first cooling occurred equally quickly with cold and warm winds, but the recovery was slower after more intense and longer cooling. The velocity of the wind had an influence on the cooling. A velocity of 0.6 m. per second caused in five minutes a drop in the forehead temperature of 1.5 degrees, but a velocity of 3 to 6 m. per second only lowered it 3 to 4 degrees. Upon interruption of the wind the skin temperature rose at once. The lowest temperature obtained and the amount of difference between it and the temperature of the wind bore no relation to the feelings of the subjects, except that a prolonged draft was followed by a feeling of discomfort and cold in the parts usually covered by clothing. Several times rhinitis, sore throat, or bronchitis was observed. In the parts usually covered by clothes, the response to the stimulus of cold was slower than in the unclothed parts, owing to the difference in the vasoconstrictor muscles.

According to these experiments, drafts may cause bodily harm, because of the fact that the heat-regulatory mechanism of the body is not efficient for protection.—H. G. Noyes.

WOMEN AND CHILDREN IN INDUSTRY

MEDICAL ASPECT OF WOMEN'S ILLS IN INDUSTRY. *Clara P. Seippel.* U. S. Bur. Labor Statis., Month. Labor Rev., Nov., 1921, 13, No. 5, 945-950.—In 1910 eight million women in the United States were wage earners, and probably now about five million women and girls are working in shops and factories. Woman is a permanent factor in industry.

Statistics in regard to the ills of women in industry are largely wanting. There are some comparative figures about the relative occurrence of diseases among men and women, but little of value about women as women. Most figures also are based on absenteeism, while there is a great unaccounted loss from the ills of women who remain at work. Women appeal to the medical department of the shop most frequently because of headaches and dysmenorrhea. A large part of the minor ills can be traced to bad hygiene and irregular habits of life. Many girls go to work without breakfast. Many neglect to go to the toilet during the day, and so bring

on ill health; and this condition is due in part to the improper placing of toilet rooms, necessitating loss of time or embarrassment in going to them.

The monotony of women's work and natural fatigue predispose to illness, although, except for hazards, women in industry are not subject to disturbances not encountered elsewhere. But thousands of women accept unnecessary suffering habitually, especially in regard to menstrual functions, without ever understanding that it is avoidable. Often a simple cathartic for a few days before the period gives much relief. In general, there is need of employing nonsurgical methods as far as possible in correcting these ills. A very common condition is menorrhagia, very often neglected when perfectly amenable to treatment. Amenorrhea is also common, especially during the first year of industrial life, and the majority of cases respond to medical treatment.

Among older women there is also much unnecessary suffering. Very many think that the ills of the menopause are unavoidable. The hot flashes and other nervous disturbances which are so exhausting are, however, usually easily removed. Of married women in industry probably 75 per cent. have some form of pelvic disorder before the age of 40. Retroversion is common at all ages; often the only complaint is constant fatigue. The condition can be relieved, but if neglected becomes worse until surgical treatment is the only remedy. Retroversion is so common in young girls that it ought to be taken into consideration in industry. It is unwise for girls under 16 to work constantly at machines, and such work should in no case exceed two hours at a stretch.

Attention to simple matters of dress, ventilation, recreation, food, sleep, etc., would help greatly. "Our task is to educate the woman worker to take an interest in herself and to regard her health as the capital she has invested in the business from which she must draw her dividends of livelihood, happiness and contentment. That is the first step towards the conservation of woman power and the reduction of women's ills in industry."—G. E. Partridge.

THE JOINT BOARD OF SANITARY CONTROL IN THE NEW YORK LADIES' GARMENT INDUSTRIES. Internat. Labour Rev., Jan., 1922, 5, No. 1, 125-129.—The Joint Board of Sanitary Control in the New York Ladies' Garment Industries was established in 1910. There are seven members: two nominees of the manufacturers, two of the trade unions, and three representing the general public.

The activities of the board are divided into four sections: sanitary, medical, fire-drill and educational. The educational aspect of the work has been emphasized and has been conducted by personal interviews, sanitary certificates, bulletins, journals, leaflets, through conferences, lectures, the press, exhibitions, and other means. The board is empowered to establish standards of sanitary conditions in the industry. There are shop committees giving special instruction in sanitation in a six-weeks' course.

Every half-year an inspection is made of the 3,866 workshops and the whole industry is then divided into four classes according to the defects found, and re-inspection varies in frequency accordingly. In connection with the system of inspection the board has established a nursing and first-aid service which installs and maintains first-aid equipment in each shop and instructs the workers in methods. Experts on light and ventilation are provided when needed. Certain of the local unions of the International Ladies' Garment Workers' Union own, manage, and finance a Union Health Center, and attention is given to preventive medicine; therapeutic clinics are also maintained. A number of the local unions have a tuberculosis benefit.

The result has been a complete change in the character of the industry.—G. E. Partridge.

THE EMPLOYMENT OF CHILDREN IN THE WEAVING INDUSTRY IN PERSIA. Internat. Labour Office, Official Bull., Dec. 21, 1921, 4, No. 25, 529-531.—Some time ago, the attention of the International Labour Office was drawn to the unsatisfactory conditions under which women and children are employed in Persia in certain carpet factories, especially in Kerman, and the matter was taken up with the Persian Ministry of Foreign Af-

fairs. As a result, the Persian government has taken steps to remedy the conditions of labor, and pending definite measures the Kerman local authorities have been requested to enforce the following articles:

"1. Engagement of workers to be effected with complete liberty on both sides.

"2. Eight-hour day.

"3. Prohibition of employment of boys and girls under age of ten years.

"4. Permission for workers to leave factory at midday for rest.

"5. Provision of healthy sites and pure air for factories.

"6. Preparation by local authorities of comfortable and suitable seats for women and children to allow work in normal positions, etc."—M. C. Shorley.

INDUSTRIAL SANITATION: FACTORY CONSTRUCTION, ILLUMINATION, VENTILATION, HEATING, WATER SUPPLY, SEWAGE DISPOSAL

VENTILATION AND EFFICIENCY IN FACTORIES. *Leonard Hill.* Lancet, Jan. 7, 1922, No. 5132, 56-60.—This lecture (a Chadwick Trust lecture) presents the modern view of the physiological action of ventilation. The importance to health of basal metabolism is stressed, and the necessity of exercise for increasing this metabolism is pointed out. On the other hand, the claim is made that sedentary occupation in still, warm atmospheres lowers the basal metabolism, slackens muscular tone, lessens appetite, causes constipation, makes shallow the breathing, and slows the circulation, rendering the worker feeble in health and liable to disease. Attention is drawn to the importance of respiration for cooling the body through the aqueous vapor exhaled. Efficiency is lowered by moist warm atmospheres; thus, a British student eats daily food of the value of some 4,000 calories, while a Malay student consumes food of the value of about 1,600 calories only.

Ventilation for workers, whether doing hard manual work or following some more sedentary occupation, should be varied within the limits necessary for maintaining an active metabolism. The condition of the atmosphere is only imperfectly ascertained by using ordinary wet and dry bulb thermometers; by these means, it is true, temperatures may be noted dangerous from the point of view of heat stroke or frost bite, but accurate information cannot be obtained as to the invigorating power of the atmosphere at ordinary temperatures. The use of the kata-thermometer for this purpose is advocated, and instances are quoted where it has been employed in industrial processes. Dr. Hill sees in exposure to moving and cooling air the influence which so increases natural metabolism as to maintain resistance against disease; hence comes an impulsion to activity rather than to sit still and feel chilled.

The time cannot be far distant when an agreed standard of ventilation as determined by the kata-thermometer will prevail in industrial establishments.—E. L. Collis.

COMPRESSED-AIR BLOWERS AS AN AID TO METAL-MINE VENTILATION. *R. V. Ageton.* U. S. Bur. Mines, Reports of Investigations, Serial No. 2309, January, 1922.—The author shows by psychrometric, kata-thermometer, and anemometer measurements that compressed air blowers are unsatisfactory and that much better results are obtained by the use of suction fans furnishing fresh air from the surface. It is also shown that the latter method is much less expensive and its adoption is advocated.—Philip Drinker.

WHAT ABOUT OZONE? *E. Vernon Hill* and *John J. Aeberly.* Heating and Ventilating Mag., Jan., 1922, 19, No. 1, 37-40.—The present paper is a continuation of the authors' article in the December issue of the Heating and Ventilating Magazine, and details experiments on the action of ozone on galvanized iron ducts, with results that show no loss in ozone or oxidation of the zinc of the galvanized coat. Enameled sheet iron showed signs of oxidation on the walls of the ozonizing chamber. Odor tests using butyric acid for comparison gave more or less negative results, while several tests with bacteria laden air gave no conclusive evidence of the

germicidal value of ozone. By testing the mould on stale bread the authors concluded that the ozone had destructive properties. Gas masks were used in working with concentrations of over 100 parts of ozone per million.—Philip Drinker.

WHAT ABOUT OZONE? *E. Vernon Hill* and *John J. Aeberly.* Heating and Ventilating Mag., March, 1922, 19, No. 3, 36-37.—This is the concluding paper of the series of articles on ozone by the same authors. The possibilities of using ozone as a deodorant and disinfectant in ventilation and in air conditioning are discussed, and a few data are given on its use as a germicide and in the destruction of vermin.—Philip Drinker.

HEAT AS A MEANS OF DESTROYING MILL INSECT PESTS. *J. P. Calderwood.* Heating and Ventilating Mag., March, 1922, 19, No. 3, 25-26.—The use of heat as an insecticide, particularly in flour mills, is discussed, and examples are given of the successful application of heat, in summer, at a temperature of 130° F., for which a modern mill heating plant need be but little modified. A formula for calculating heating capacity required is given.

Hydrocyanic gas as an insecticide is claimed to be less applicable because of the danger incurred as well as because of the greater expense, as compared with heat.—Philip Drinker.

INDUSTRIAL MEDICAL SERVICE: MEDICAL DISPENSARIES AND HOSPITALS IN INDUSTRIAL PLANTS

DENTAL WORK AS A PROPHYLACTIC MEASURE IN IMPROVING THE PHYSICAL CONDITION OF EMPLOYEES. *T. P. Hyatt.* Am. Jour. Pub. Health, April, 1922, 12, No. 4, 325-327.—This paper is a brief review of the dental prophylactic work carried out by the Metropolitan Life Insurance Company for its office employees. In this company's dental clinic two cleansings of the mouth are given each year and X-ray examinations made of all teeth having crevices, bridges, or non-vital pulp. The X-ray examination has greatly helped in the improvement of the health and efficiency of the employees. A number of cases are cited where this examination has resulted in the removal of foci of infection, evidently responsible for chronic ailment of various types. The fact is noted that these patients with chronic focal infection almost always suffered markedly from fatigue.—H. F. Smyth.

EFFICIENT RECORD MAKING IN THE TREATMENT OF INDUSTRIAL DISABILITIES. *Harry L. Langnecker.* Calif. State Jour. Med., Dec., 1921, 19, No. 12, 477-479.—The author emphasizes the necessity for better record keeping in the treatment of industrial disabilities. Methods should be simple, definite, and uniform, and should include every available detail. Sample record forms are shown, and the apparatus necessary for the estimation of deformity of the extremities, of back injuries and of foot disability are illustrated.—M. C. Shorley.

INDUSTRIAL NURSING

PART TIME INDUSTRIAL NURSING. *Nora Rowell.* Pub. Health Nurse, Feb., 1922, 14, No. 2, 85-86.—The object of part-time industrial nursing is to give to small factories, at a price that is not prohibitive, the same advantage of health supervision that the up-to-date big factory enjoys. The attitude of the small factory toward health welfare work is generally negative, simply because it has not been tried out. The objects of the work are:

1. Greater efficiency of the working force.
2. Diminished loss of time and suffering from preventable diseases.
3. Increased contentment of the workers.
4. Better spirit of co-operation on the part of the employees.

A friendly feeling is encouraged between the nurse and the workers. The nurse, coming in from a different angle than the foreman, can encourage a spirit of pride and

thus solve long-standing problems. The workers are encouraged to come to her, so that she may avoid diverting their attention from their work by going among them. A regular inspection of the factory, however, provides enough circulation among the workers to stimulate and maintain interest. — M. Mahoney.

INDUSTRIAL PSYCHOLOGY AND INDUSTRIAL MANAGEMENT IN ITS HEALTH RELATIONS

THE HUMAN FACTOR IN INDUSTRY. IV. *C. H. Northcott.* Indust. Management, Jan., 1922, 63, No. 1, 36-41.—Much of the stunted development of workers in all countries or "their low standard of comfort" is due to the relative smallness of their wages. It is just that industry should bear the obligation of paying a sufficient reward, and parasitic industries that cannot pay their way on this basis are a burden to society and a curse to the workers.

With regard to the definition of just remuneration we have not advanced very far. The National War Labor Board at Washington followed a standard which would ensure "the subsistence of the worker and his family in health and reasonable comfort." But no wage is fair that does not reward skill and effort in proportion as they are manifested; and a wage is not fair which does not increase with increased effort and increased output. As a practical means the rate-fixing adopted in some factories, in which a workers' rate-fixer and a company's rate-fixer confer and agree is good. But there is also a wider view since the "square deal" is so important in maintaining peaceful industrial relations, and one solution is the establishment of a wages department alongside of the employment department, the function of which is to determine fair wages in every part of the work.

Industry also owes its workers security, and for this an economic argument as well as a human argument can be proffered. Industry should make no significant difference between those who, in bad times, are unemployed, and those who are employed the whole time, since industry is always in need of a reserve. Only by guaranteeing some degree of maintenance during unemployment can the capitalist undertake fully the risks of industry and thus overthrow one of the most powerful arguments against continuance of the present industrial system. The human argument is obvious: unemployment is the dark shadow over the lives of workers. It inhibits co-operation and retards production because of the fear which it produces. Unemployment is a cause of both physical and moral deterioration. Present insurance plans are inadequate, but a recent plan worked out in Great Britain is more feasible. A rate was proposed according to which, varying with the size of family, etc., the unemployed man should receive a sum up to a possible 75 per cent. of his wages, the fund being provided by a levy of one penny in ten shillings of wages on the workers and a contribution of about .2 per cent. of the wage bill from the employer; and this has been made the basis of an unemployment benefit fund established by one firm.

Industry should afford time for leisure and recreation. The forty-eight-hour week is a maximum, but the plan to crowd the forty-eight hours into a five-day week is not defensible, although the forty-four-hour five-day week is practicable.

Equally important is mental satisfaction. The employee should be instructed in regard to the nature of the business, and should later have lessons in organization and in the function of the departments of the industry. In one case in which new employees were given introductory instruction of this kind this group "far surpassed any record for efficiency set up by their predecessors."

Regard for personality is the most important of all in the relations of industry to employee, and with the increasing mechanizing of processes it is harder to attain. All possible conditions favorable to health and comfort and contentment must be provided, therefore, and the "employer who will give time and money to make his workers comfortable is more likely to have efficiency and content within his factory."

There must be proper vocational selections; workers are more likely to develop into the

men and women they should be if the jobs to which they become attached fit them. Here the industrial psychologist functions. He alone can scientifically estimate a worker's capacities in respect to such qualities as dexterity, speed of perception and reaction, quickness and reliability of choice, accuracy, forethought, ingenuity, etc. Each industry owes those who apply to join it guidance as to their adaptability and suitability.

Work is physically satisfying and interesting only if it gives free play for one's instincts, including those of workmanship, domination and submission. Men have still a pride in work, but above all they want to feel that they count in industry. And they want some share in control over measures affecting their own lives. This means some type of industrial representation.

"To make of each worker an understanding contributor to the world's work, while not the ultimate end of life, is the most splendid end that industry can achieve, and the discharge of the debt that it owes him."—G. E. Partridge.

THE SERVICE OF NEUROPSYCHIATRY TO INDUSTRIAL MEDICINE. *H. W. Wright.* Calif. State Jour. Med., Dec., 1921, 19, No. 12, 464-468.—Labor turnover is a cause of much expense and trouble in industry; it is usually due to a faulty adjustment of the employee and to his susceptibility to influences. The maladjusted are usually constitutionally defective, psychopathic, psychoneurotic or physically sick. The industrial problem, therefore, needs to be considered from the standpoint of neuropsychiatry.

"Now, we all know what war neurosis is, and most of us are familiar with traumatic neurosis as seen in industrial life, and we appreciate that both are the result of the same essential factors, namely, a conflict between the instinctive tendency to withdraw from danger or discomfort to seek safety or ease, and the less primitive and, therefore, weaker tendency to stand by the social group and carry on with one's duties or burdens of life. And yet the results we are getting with traumatic neurosis in industrial life are deplorable! And this is because there is no well organized effort to diagnose it early and treat it early before the fixation of its symptoms."

What is the function of the neuropsychiatrist in industry? In part to eliminate the unfit, but more to enable the employer to retain his employees and fit them to work, to help the neurotic to adapt himself to difficulties through a better self-understanding. The psychiatrist's larger field of usefulness will be in dealing with borderline nervous and mental disorders and differentiating them from organic and incurable conditions.

The types of problems which the neuropsychiatrist will meet most in industry are: (1) the detection of the unemployable for any kind of permanent employment; (2) the proper placement of those who, though handicapped by nervous or mental defects, can be permanently employed — *e.g.*, the placement of the feebleminded and also of those having special abilities; (3) bringing about better feeling on the part of foremen and employers toward peculiar individuals having mental episodes, and a better understanding of those requiring change and rest; (4) early diagnosis and therapy of traumatic neurosis. In all of this work the aid of the laboratory psychologist and intelligence tester will be very valuable.

Examination should include a general interview, general physical and neurological examination, and a later interview when all available data are taken into consideration. The examiner should always make it clear that the examination is primarily for the benefit of the employee.

A very useful outline for examination is appended. This includes directions for taking the anamnesis; for mental examination with respect to appearance and behavior, spontaneous talk, mental attitude, orientation and memory, intelligence (to be tested by the Binet-Simon methods, Healy's modification of the Binet-Simon scale, and Ziehen's tests).—G. E. Partridge.

PERIODIC VARIATIONS IN EFFICIENCY. *Archibald G. Peaks.* Abstracted from Educational Psychological Monographs No. 23, 1921, in The Digest, Jan.-Feb., 1922, 4, Nos. 1-2, 2.—"On the assumption that there are periodic variations in mental and physical efficiency, experiments were made to determine

the periodicity of attention, muscle strength, primary memory, strength and endurance. The relation between conduct and weather, civilization and climate, the effect of weather on the ability to learn, the effects of variations in the sunlight, effects of changes in temperature, effects of variations in the humidity—all these in so far as they affect personal efficiency are taken up in turn."

INDUSTRIAL SERVICE AND MUTUAL BENEFIT ASSOCIATIONS

HEALTH AND WELFARE IN THE COAL MINING INDUSTRY. *Edgar L. Collis.* Jour. State Med., Jan., 1922, 30, No. 1, 15-27.—One of the aims of welfare work in this industry is the reduction of excessive labor turnover by dissuading unsuitable persons from engaging in coal mining. In the mines, there are several matters needing serious attention. Clean drinking water is an important necessity for the miner and a supply carried to the workings would be of great benefit to prevent his recourse to dangerous underground water. The inauguration of colliery kitchens from which freshly cooked food could be sent to the workings would be a healthful improvement over the "picnic" lunches that the miners now have to eat. Pithead baths for the miners are considered a highly important factor in promoting their moral and social, as well as their physiological well-being.

Underground lighting stands in urgent need of improvement since poor illumination is largely responsible for many accidents and for nystagmus. Another health question is the occurrence of beat-hand, beat-elbow and beat-knee, of which there were 2,772 cases claiming compensation in 1914, and an inquiry should be set on foot to ascertain whether this condition and bronchitis and pneumonia, from which miners in certain coalfields suffer in excess, are not preventable.

For the reduction of accidents, safety-first methods should be impressed upon the miners. Investigations have shown that certificated illness rises and falls with so-called avoidable absences, which means that so-called absenteeism is governed by influences controlling actual sickness.

Outside of working hours, a helpful influence may be exerted by providing acceptable means for recreation, such as gardening, and for educational improvement. Establishment of competent electric massage institutions to treat injuries of muscles of the back and limbs of miners is recommended.

When the mortality rates of coal miners for 1910-1912 are compared separately for the seven great coalfields of Great Britain with the strike ballots of the miners taken in the summers of 1920 and 1921, a curious thing is noticed. The different fields voted for a strike according to their death rates. This observation would seem to indicate that the usual reasons given for social unrest are merely conscious efforts to explain unconscious impulses, and that these unconscious impulses are founded upon ill health.—Barnett Cohen.

CHANGE-HOUSES FOR WORKMEN. *C. Lorimer Colburn.* Nat. Safety News, Jan., 1922, 5, No. 1, 29.—This article deals with types of change-houses for mine workers and other industrial employees.

A satisfactory change-house is that used by the Utah Fuel Company, at the Castelgate No. 2 mine, where hooks are provided so that the clothing of the workmen can, by means of a cable over a pulley, be elevated near the ceiling where there is plenty of warm air. Benches conveniently placed on the concrete floor provide for the men when changing their clothes. After hanging their clothing on hooks, they elevate the hooks, a padlock making it impossible for anyone else to lower a man's hook after it is drawn up.

The New Jersey Company at Franklin, N. J., uses lockers for its change-house. By use of a blower system, fans, arranged at the roof of the building, suck the air through the lockers and discharge it through the roof. "Steam pipes run through the lockers and furnish the heat necessary to dry the clothes."

Toilet rooms and shower baths are placed conveniently in both change-houses.—M. C. Hamblet.

INDUSTRIAL HEALTH LEGISLATION: COURT DECISIONS: WORKMEN'S COMPENSATION AND INSURANCE

LABOUR LEGISLATION ARISING OUT OF THE INTERNATIONAL LABOUR CONFERENCE. Internat. Labour Office, Official Bull., Nov. 16, 1921, 4, No. 20, 431-438.—Bills giving effect to the Draft Conventions and Recommendations adopted by the Washington Conference have passed their first reading in the Brazilian Chamber of Deputies. The bill relating to the employment of women makes effective certain provisions about night work and the employment of women before and after childbirth, and also the recommendation concerning the protection of women and children against lead poisoning. The bill dealing with employment of children fixes the minimum age for admission of children to industrial employment, regulates the night work of young persons employed in industry, and follows also the recommendation for protection against lead poisoning.

The bill concerning women contains twenty-three paragraphs. It prohibits the employment of women in certain occupations, such as mining, and in establishments where conditions are prejudicial to the constitution of women, and also in night work. Hours of labor are limited to eight, with a minimum rest of one-half hour. Every worker shall be entitled to a rest period of thirty days preceding and forty days following childbirth, with two-thirds wages, and the position of the worker must be kept open for her. Time without deduction of pay is allowed the nursing mother. Provisions are made for protection from hazards likely to affect women in the period of pregnancy, and for the establishing and maintenance of nursing rooms. The employment of "female young persons" as actresses, etc., in circuses, café concerts or theatres is prohibited. Except when necessary, male workers are not to be employed in the same room with female workers.

The bill concerning the employment of children contains twenty-five paragraphs. Children of either sex under 14 years—with certain exceptions—are not to be employed. Children, when admitted to employment, shall not be employed more than six hours a day, and shall have a right to thirty-six consecutive hours a week for rest. Certain occupations are prohibited to young persons under 18 years. The Ministry of Labor may at any time forbid the employment of a child if the state of health is not such as to allow heavy labor. In establishments of all kinds where children are employed, employers shall be obliged to maintain their plant in the "most perfect working order," and to provide suitable protection against dangerous machines and tools. Children covered by the act are not to be employed on piecework, or work by contract, or overtime, etc.

Adoption of the Berne Convention of 1906 on the prohibition of the use of white phosphorus in the manufacture of matches is also reported.—G. E. Partridge.

INDUSTRIAL MORTALITY AND MORBIDITY STATISTICS

COAL MINE FATALITIES IN THE UNITED STATES AND THE UNITED KINGDOM. Internat. Labour Rev., Jan., 1922, 5, No. 1, 139-144.—Statistics in regard to mine fatalities during the years 1913-1920 are presented in eight tables. The number of workers employed and the fatality rate for each year are given, and the death rate for the period considered is compared with that of other periods. Fatality rates in metal mines in the United States are compared with those for the United Kingdom (they are about three times as high in the United States); fatality rates in quarries are also shown, those for the United States being higher, but not to so great an extent as in metal mines. In coal mining, however, the rate in the United States exceeds that in the United Kingdom in about the same proportions that hold for metal mining. Coal mine fatalities in the United States and the United Kingdom are shown also with reference to their causes. In both countries falls of ground account for about 50 per cent., and underground and shaft accidents for about 90 per cent. Progressive improvement is shown in the United Kingdom in regard to coal mine fatalities, but not in the United States.—G. E. Partridge.

ABSTRACT OF THE LITERATURE

OF

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GENERAL

ADDRESS ON INDUSTRIAL HYGIENE. *J. G. Cunningham.* Nat. Hyg. and Pub. Welfare, Jan., 1922, 58, No. 1, 54-63.—This paper touches briefly on several points of interest to the industrial hygienist: inheritance of effects of industrial poisonings; infant mortality in communities having a high percentage of industrially employed women; industrial medical examination for young persons entering industry as practised in Great Britain; standardized classification of industries and types of industrial disease; specific hazards and general hazards. There are some interesting reviews and opinions in regard to the present status of lead poisoning, tuberculosis, and cancer in relation to industrial conditions as predisposing causes.—G. E. Partridge.

SICKNESS FREQUENCY AMONG INDUSTRIAL EMPLOYEES. U. S. Pub. Health Ser., Pub. Health Rep., Jan. 6, 1922, 37, No. 1, 2.—The report relates to morbidity among wage earners, as shown by data provided by some manufacturing companies and benefit associations covering the period from January, 1920, to June, 1921. The items refer to disabilities lasting one week or longer. Most of the associations have age limits and restrictions, so that the report represents a "minimum statement of disabilities actually occurring."

Frequency of the disease groups is shown in two tables and a chart, and is given for each month of the period. It appears that serious illness was about twice as frequent in the winter of 1920-1921 as in the summer

of 1920. In general, the rate was higher in 1921 than in 1920. The digestive diseases show no greater prevalence in the warm weather, but respiratory diseases were about three times as frequent in February, 1921, as in June of the same year. The seasonal variation of the four most important causes of disability—tonsillitis, bronchitis, rheumatism, and pneumonia—is shown in a chart with curves plotted on a logarithmic basis. The seasonal fluctuation of the four diseases "appears to be fairly similar, though there is a tendency for the peak of the curve of rheumatism to be reached a month or two later than the time at which the other three diseases are most prevalent." There was a wide difference in the morbidity rates for different benefit associations, one having four times as many cases per 1,000 as another, and a severity rate represented by 10.27 days as compared with 1.54 in the other.—G. E. Partridge.

Sickness among Office Employees. *Dean K. Brundage.* U. S. Pub. Health Ser., Pub. Health Rep., March 10, 1922, 37, No. 10, 527.—This is a report of one year's experience of a large manufacturing company in the Middle West which recorded the number of hours lost from work by each office employee on account of sickness and accidents. The average number of persons employed during the year ending January 31, 1921, was 1,282, with women in the majority; and the average age of the group was 23.7 years. There were two cases of disabling sickness per person, and the average number of working days lost per case was 3.8. Over 9 per cent. of all dispensary calls were due to minor infections, yet not a single case of disability from purulent infection developed. Common ailments, colds, rhinitis, headache and sore throat, were responsible for the greatest amount of disability. Sex is a considerable factor in disability; the departments having the largest proportion of men had the lowest illness rates. Fatigue caused a surprising amount of disability both in duration and incidence. The average duration of 11.66 working days per case of fatigue was by far the longest of any of the fifteen most frequent causes of disability. —Barnett Cohen.

Ship Sanitation and First Aid for Merchant Seamen. U. S. Pub. Health Ser., Pub. Health Rep., March 31, 1922, 37, No. 13, 758.—"The Secretary of Commerce has recently approved an amendment to the general rules and regulations prescribed by the Board of Supervising Inspectors, which requires that no candidate for original license as master, mate, pilot or engineer shall be examined unless he has completed a course of instruction in 'first aid' approved by the U. S. Public Health Service and has passed an oral examination based on a Manual of Ship Sanitation and First Aid recently prepared by the Public Health Service in co-operation with the Seamen's Church Institute of New York City."—Barnett Cohen.

Some Recent Reports on Vocational Selection in England. *D. R. Wilson.*—Until recently the terms vocational guidance and vocational selection were almost unknown in England, notwithstanding the large amount of work on these subjects carried out in other countries, notably in the United States and Germany. Even during the war when the need for the rapid and successful filling of vacancies was especially acute, work on vocational selection was confined to a few specialized branches of the fighting forces (1) (2) (3), and nothing was attempted comparable with the extensive classification of the personnel in the United States army (4), or the selection in Germany of women workers for the printing trade (5) (6) and for street car driving (7).

Within the past two years, however, there have been signs of increasing interest in the subject. The Industrial Fatigue Research Board, for instance, has included the scientific study of the problem within its sphere of work, and the National Institute of Industrial Psychology has now been established with the object of developing vocational guidance on practical lines.

Under the circumstances the English literature on the subject is at present small, but a few reports and papers dealing with original research on vocational tests have already been published. In the earliest of these (8) issued by the Industrial Fatigue Research Board (which has already been re-

viewed in the Abstract Section of THIS JOURNAL, May, 1922, 4, No. 1, 2) the whole of the literature on the subject has been reviewed.

More recently a new report from the same source has appeared, containing an account of three investigations on the subject (9). The first study is based on an investigation conducted among compositors, readers, and monotype keyboard operators in two printing works. The procedure adopted was as follows:

1. The work was closely observed and the particular capacities that seemed to be demanded by it were noted.
2. Suitable tests of these capacities were devised.
3. The operators were graded from an independent source, generally from the opinion expressed by the manager or foreman as to the proficiency of each individual.
4. The tests were applied and a second grading based on these tests obtained.
5. The two gradings were compared, and by applying the method of partial correlation, such tests as were shown to be unnecessary or undesirable were eliminated.
6. The independent grading was correlated with a grading based on the remaining tests.

In the case of compositors, the following capacities were first tested as the result of observation of the work:

a. Dexterity (*match stick insertion test*).
b. Rapidity of observation (*two cancellation tests*).
c. Immediate memory (*substitution test*).
d. Visual perception of form (*form board test*).
e. Intelligence (*directions test*).

Of these, one of the cancellation tests, the form board, and substitution tests were subsequently discarded, and the final results based on the remaining three tests.

The results obtained at one of the works may be graphically represented by Figure 1.

The ordinates are the ranks for the tests—that is, "1" indicates the *rank* of the compositor who made the best performance in the tests; "2" that of the compositor who made the second best performance, and so on. The abscissae are the ranks for composing efficiency. The position of the fourth dot, for instance, indicates that the compositor who was fourth in the tests was also fourth in composing efficiency. The straight diagonal line indicates a possible absolute correspondence between the rankings for composing and total efficiency in the three tests (an r of +1.) The dots represent the individual compositors. The degree of correlation is indicated by the nearness of these dots to

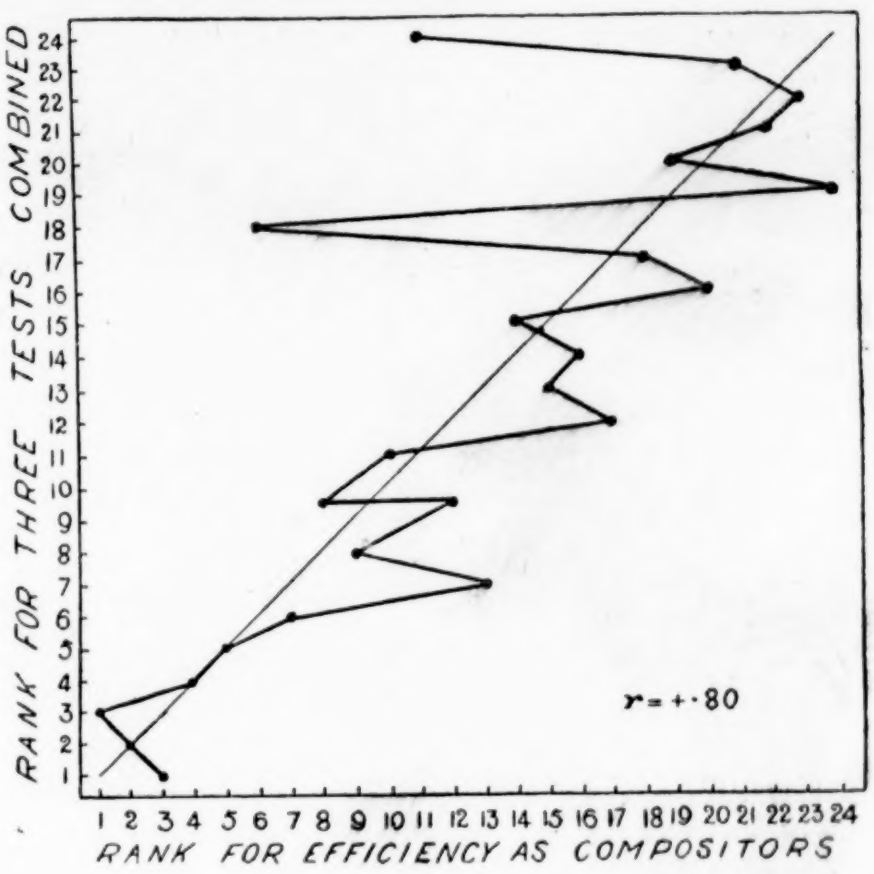

FIG. 1.—Graphical representation of the degree of correlation at a printing works between composing efficiency and total score in the *Cancellation*, *Match Stick Insertion*, and *Directions* tests.

the straight diagonal line. If a dot falls on this line, the compositor indicated by it occupies exactly the same position in the test and work rankings. While this seldom happens, the distance of the dots from the line of perfect correlation is rarely considerable.

Similar results were obtained in the case of the compositors in another works, the coefficient of correlation here being +0.71.

On the general significance of these results, Muscio emphasizes the fact that composing efficiency does not depend solely on the possession by the compositor of the psychophysiological capacities measured by the tests, but also on other factors, such as trade knowledge, general health, application and ambition, not affecting efficiency in the tests. Hence, perfect correlation between

efficiency in the tests and composing efficiency could not in any case be expected, but the high correlation coefficients obtained indicate that the functions brought into operation in the performance of the tests are nevertheless distinctly important in composing efficiency. Some preliminary tests were also carried out on readers and monotype keyboard operators.

The second and third studies in this volume are of special interest in that they deal with vocational selection on a non-psychological basis, with the consequent recognition that in selection for industrial work physical and physiological qualities must also play an important part. In the second study the author deals with the measurement of physical strength of 2,300 youths in Manchester and industrial Essex. He points out that many forms of work make special physical demands on the worker, and that inadequate muscular development induces unnecessary fatigue and inefficiency,* and suggests tentatively that, with regard to the subjects tested, possibly 10 per cent. of those who become engineering apprentices do not possess the physique required for engineering work, so that some decrease in fatigue and inefficiency could be effected by guiding these persons into vocations where physical strength is not required and by substituting for them others of more adequate physique. His other conclusions are:

"(i) that the muscular strength test devised by Martin [10] (based on tests for certain groups of muscles) is unsatisfactory for general industrial work, chiefly because results obtained by it are partly a function of the particular operator;

"(ii) that a combination of grip and weight gives a useful indication of general strength, though a better indication would almost certainly be obtained by the addition of a suitable test of the strength of the forearm flexors;

"(iii) that the Essex adolescent males engaged in engineering are consistently superior physically to Manchester adolescent males engaged in the same type of work."

*A careful distinction, however, is drawn between physical strength and *endurance*, and the investigation is concerned solely with the measurement of the former.

A set of percentile tables is appended by the use of which the general strength of an individual may be estimated from his grip and weight.

The third study is based on a somewhat similar investigation conducted among girls employed in a confectionery factory. The subjects selected were manual workers, paid on a piece rate system, and the measurements taken were chiefly those of the arms, hands, and fingers. In each process the workers were divided into two groups (A and B), composed of those whose output was high and low respectively, and the physical types of both groups compared so as to ascertain whether proficiency is related to any particular type.

The results indicate that two distinct types exist, designated long-spanned and short-spanned, and that the long-spanned type manifests itself in the A group among the packers, and in the B group among workers in the packet department and dippers, suggesting that a long span is desirable for packing and a short span for the other kinds of work. This conclusion, however, cannot be regarded as definite until it is known how far the occupation itself develops these characteristics; in packing, for example, the fingers are constantly used in an extended position; in the other classes of work the exact opposite is the case.

A more intensive treatment of the data (by the method of correlation) led to rather indefinite results, and the conclusion reached is that while the physical type appears to play a part—though a small one—in proficiency in work, it is related to the work in question and not to any *general* characteristics making for proficiency, and that there are other and more powerful factors connected with proficiency which cannot be arrived at by physical measurement and which tend to mask the influence of physical type.

The most recent paper on the subject of vocational selection (11) deals with tests for clerical occupations. It is practically limited to a description of the methods adopted, the full results not yet being available. The tests were devised for application to those who at the time of testing profess

to have been trained in their work and who appear as candidates for particular appointments, and not for ascertaining whether untrained beginners possess such capacities as to make it worth while submitting them to the requisite period of training. The investigation, therefore, deals rather with the measurement of proficiency than of aptitude.

The method of procedure adopted was as follows:

1. A preliminary series of tests was carried out on a few experienced persons, such as students of psychology with practical acquaintance of clerical duties. With their assistance, unsatisfactory tests were modified or eliminated, and the procedure was mended and improved.

2. Of the tests thus selected, the more important were applied to about a hundred schoolchildren aged 13 to 15, principally with the object of grading the test questions more uniformly and of arranging them in the order of increasing difficulty.

3. Lastly, the tests so re-arranged were applied to thirty typists in the office of an education authority, who were graded by the supervision of the department in order of merit from the point of view of clerical efficiency. The correlation between the tests and the independent order was then determined.

The tests themselves included:

1. Four graded tests of intelligence.

3. Two tests of linguistic ability and tainments.

3. Two tests of linguistic ability and general information.

4. Tests of typewriting and shorthand writing.

a. Shorthand (graded speed and outline tests).

b. Typewriting (speed tests, tests of accuracy and display, and manuscript reading).

The full results of the investigation are not yet available, but the author states that the correlation coefficients already obtained are sufficiently high to warrant the immediate practical use of the tests.

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SYSTEMIC OCCUPATIONAL DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

CIRCULATORY SYSTEM

POTENTIAL CARDIAC DISEASE AND PREVENTION OF ORGANIC HEART DISEASE IN CHILDREN. *William St. Lawrence.* Jour. Am. Med. Assn., April 1, 1922, 78, No. 13, 947-952.—The author summarizes as follows:

"1. Sixty-five cases of potential cardiac disease in children were continuously observed for an average period of four and one-half years.

"2. Forty-nine patients (75 per cent.) remained free from evidence of cardiac disease during that time.

"3. Of twenty-five patients with acute rheumatic fever in the series, none contracted a lesion in the heart.

"4. Of nine patients with myositis, bone and joint pains (growing pains) and sore throat, none contracted a lesion in the heart.

"5. Sixteen patients (25 per cent.) con-

tracted a cardiac lesion while under observation.

"6. In every case in which a cardiac lesion developed, the clinical picture was dominated by chorea in a severe form. No patient contracted a lesion in the absence of this manifestation.

"7. Of forty-one patients with chorea in the series, sixteen (39 per cent.) contracted a lesion in the heart.

"8. Measures of value in preventing disease of the heart are of greatest benefit when directed against acute rheumatic fever and myositis, bone and joint pains (growing pains) and sore throat.

"9. Such measures have little if any value when directed against chorea.

"10. In untreated potential cases, acute rheumatic fever is the most important factor concerning disease in the heart.

"11. In potential cases under management, chorea is the most important factor concerning disease in the heart.

"12. With the exception of mitral stenosis, cardiac lesions practically always occur during the active phase of a rheumatic manifestation or a period of pyrexia. In the absence of an active phase, the physical signs in the heart remain unchanged.

"13. Evidence of mitral stenosis may not appear for a year or more after the cessation of the rheumatic manifestations. It is therefore impossible to state at the conclusion of an attack of acute rheumatic fever or chorea that the heart was unaffected by these conditions.

"14. Heart rate may have a marked effect on the physical signs of mitral stenosis, as shown by a graphic record."—C. K. Drinker.

HEART DISEASE IN INDUSTRY. *Cadis Phipps.* Jour. Am. Med. Assn., Feb. 25, 1922, 78, No. 8, 562-564.—Reviewing the records of 650 cases examined for the Massachusetts Industrial Accident Board, Phipps found that in 231 cases there was an organic heart lesion or else there were symptoms directly referable to some functional disturbance, such as a marked arrhythmia with premature contractions. These cases were divided as follows:

Condition	Number of Cases
Mitral regurgitation	94
Mitral stenosis	36
Aortic regurgitation	6
Aortic stenosis	2
Aortic and mitral regurgitation	5
Tricuspid regurgitation	1
Acute myocarditis	1
Paroxysmal tachycardia	3
Auricular fibrillation	28
Pulse alternation	2
Myocardial degeneration	8
Arrhythmia and premature contractions	39
Pericarditis (plastic)	2
Heart block	1
Coronary sclerosis	3

The author then comments on the apparent effects of work, trauma, fright, etc., upon this group of workers who have a definite circulatory handicap, and closes with the following paragraphs:

"Summing up some of the more common injurious agents, we find that trauma is the chief factor in industry to affect the heart, occurring as it does in forty-seven of the 231 cases. Lead, occurring in twenty-five cases of different types, and other metallic poisons in nine cases (arsenic had previously been noted by Graham Steele) suggest their probable etiology and also more energetic methods of prophylaxis. Fright, occurring in ten cases, is undoubtedly an etiologic factor in producing the arrhythmias. Caisson work may easily be a cardiac menace, and the customary examination of each workman before entrance into the lock should not be restricted to ear-drums and the upper respiratory passages, but should include a careful examination of the heart.

"In view of the fact that most of the employees examined were supposedly incapacitated for some physical reason, it is surprising to note the large number of cases showing no cardiac symptoms. This is particularly true in regard to mitral regurgitation, in which sixty-eight of the ninety-four patients, or 72 per cent., complained of nothing referable to the heart, while twelve more had but slight symptoms."—C. K. Drinker.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

CARBON-MONOXIDE POISONING. *Alice Hamilton.* U. S. Bur. Labor Statis., Indust. Accidents and Hyg. Ser., No. 291, Dec., 1921, pp. 47.—"Industrial carbon-monoxide poisoning is said to be increasing in all civilized countries because of the increasing use of power and producer gas, the increasing use of motor engines, and the increasing depth of mines with the consequent difficulty of ventilation and seriousness of accidents. British statistics show that the average number of cases per year increased during the last quinquennium from 62.5 to 75 and the mortality from 12.3 to 17.3 per cent.

"Studies in European countries, especially Great Britain and France, show that industrial carbon-monoxide poisoning when not fatal is sometimes followed by serious effects, such as pneumonia, cardiac weakness, mental disease, or paralysis. Such after-effects are seen most often in coal miners.

"Chronic carbon-monoxide poisoning is described, though not clearly, by the French, English and Germans. It is supposed that the ill health complained of by cooks, bakers, laundresses, ironers, pressers in tailor shops, painters working in rooms dried by salamanders, etc., is caused by the coal gas in the air.

"Inquiries made in the United States show that acute carbon-monoxide poisoning occurs in steel manufacture, in making illuminating gas, in making coke (by-products), in using producer gas for industrial processes (especially in smelting), in coal mining, metal mining, zinc smelting, and in garages when the exhaust gases from engines accumulate.

"American statistics as to the number of cases and of fatalities are available only to a very slight extent. The figures from one of the steel companies show a decidedly lower mortality (4.8 per cent. for 1916 to 1920) than the British mortality from blast-furnace gas (22.8 per cent. for 1914 to 1919). The figures from the American Gas Institute show that among some thousand accidents during 1919 only 30 were due to gas and none was fatal.

"No statistics are available for carbon-monoxide poisoning in coal mines or in metal mines, the reports of the Bureau of Mines not distinguishing this cause of death and disability from others.

"A careful search in steel towns and in coal mining and metal mining towns failed to confirm the statements made by foreign authorities as to serious after-effects from gassing accidents. Only very rare instances of such a character were discovered. It is not possible in our present state of knowledge to explain why experience in this country differs so much from that of European observers. A more thorough study should be made of this aspect of industrial carbon-monoxide poisoning.

"The suggestion is made that some of the obscure features of poisoning by this gas may be cleared up when it is known just what other constituents besides carbon monoxide are present in a given industrial gas, and just what effects might be produced by these other gaseous bodies. It is especially suggested that small quantities of benzol may be really the active agent in cases attributed to carbon monoxide.

"Chronic carbon-monoxide poisoning may be looked for in industries in which small quantities of the gas are more or less continuously present in the air.

"Of 55 garage employees, mechanics and storage men, 36, or about two-thirds, were shown to have absorbed in their blood carbon monoxide in demonstrable quantities. Of the remaining 19 only 9 had been at work inside the garage for more than an hour when the test was made.

"Of 47 linotypists in newspaper plants where the gas from the lead pots is not carried off by an adequate suction apparatus, 8, or over one-sixth, showed the presence of carbon monoxide in their blood. The actual effect of such constant absorption of small quantities of this gas should be studied further."—C. K. Drinker.

GANGRENE FROM ILLUMINATING GAS. *Garnier* and *Cathala.* Abstracted as follows from Bull. et mém. Soc. méd. d. hôp. de

Par., Feb. 17, 1922, 46, No. 6, 304, in Jour. Am. Med. Assn., April 22, 1922, 78, No. 16, 1234.—"Intoxication with illuminating gas was responsible for the arteritis of the terminal arteries entailing patches of gangrene."—C. K. Drinker.

THE GROWING MENACE OF BENZENE (BENZOL) POISONING IN AMERICAN INDUSTRY. *Alice Hamilton.* Jour. Am. Med. Assn., March 4, 1922, 78, No. 9, 627-630.—The author states that prior to the war benzene poisoning was a rarity in this country. In 1915-1916, however, she was able to collect fourteen instances of sudden acute poisoning, with seven deaths. The men involved were pipe fitters or workmen engaged in distilling benzene or cleaning tanks, or, in two instances, sulphonating benzene as a step in the production of phenol.

Benzene is apparently extremely toxic. Lewin has described a case in which a benzene kettle which had been empty for twenty-two hours was "washed out twice with steam and three times with cold water, and then it was allowed to stand all night filled with cold water. As the workman went in, a strong current of air was blown in through a pipe. In spite of all these precautions he was overcome and fell to the bottom of the tank. Several of his fellow workmen tried to get him out, but all grew dizzy and confused, and had to give it up. Finally, an engineer in a diver's helmet succeeded in rescuing him, and he was revived; but one of the workmen who had helped in the rescue died within ten minutes of inhaling the fumes."

Other cases illustrating the toxic powers of benzol are given and it is suggested that white mice be placed in possible benzol atmospheres prior to the entrance of workmen.

The pathology of acute poisoning is apparently not significant, consisting of a tendency to incoagulability of the blood and petechial hemorrhages. Chronic poisoning has occurred most notably in rubber factories and has as its most important symptoms aplastic anemia with its accompanying symptoms, the most notable in this case being the tendency to bleeding from the gums and petechial hemorrhages. Headache, lassitude, anorexia, loss of weight, abdominal pains, and vomiting also occur. The pathology of chronic poisoning is found in the effect of the benzol upon leukocytes, platelets, and megacaryocytes, and upon the erythrocytes. These elements in blood and bone marrow are affected in the above order but in extreme cases all are markedly reduced, the bone marrow becoming aplastic.

In regard to prevention the author calls attention to Lehmann's observation that two to three parts in 100,000 may cause loss of consciousness, and that prevention must therefore rely on extremely efficient ventilation.—C. K. Drinker.

OCCUPATIONAL PURPURA. *C. Flandin* and *J. Roberti.* Abstracted as follows from Bull. et mém. Soc. méd. d. hôp. de Par., Dec. 30, 1921, 45, No. 39, 58, in Jour. Am. Med. Assn., March 18, 1922, 78, No. 11, 848.—"The young woman had been employed for nearly two months in an automobile factory, working with rubber dissolved in benzol, in what was called the 'heating room.' Three or four men and two women were employed in this unventilated room; they were entitled to leave it frequently to breathe purer air. Headache, dizziness and pallor had been followed by hemorrhagic purpura, with fever, acute anemia, and death within three weeks. There had been three previous cases of purpura within six months in the persons employed in this room, but only one was fatal. Some recent research indicates that commercial benzene (benzol) is more toxic than crystallizable benzene, and that this is more toxic than benzene obtained from calcium benzoate. Persons using benzol should have their blood examined frequently."—C. K. Drinker.

BLOOD STUDIES IN SUSPECTED LEAD POISONING. *G. Seiffert.* München. med. Wchnschr., Dec. 9, 1921, 68, No. 49, 1580-1581.—The author points out the urgent need of using blood examination, made easier by the new "thick drop" method, in all cases where lead poisoning may be reasonably suspected. Lead poisoning is increasing in incidence. Munich has a new public laboratory for industrial hygiene where such examinations are made free for any physician.

EXPERIMENTAL TAR CANCERS. *J. Fibiger* and *F. Bang*. Abstracted from the Hospitalstidende, Nov. 30, 1921, 64, No. 48, 51, in Jour. Am. Med. Assn., March 4, 1922, 78, No. 9, 696.—"Fibiger's article is published in Society Proceedings, with separate paging. He gives a historical sketch of the cancers that have been found in man from irritation with soot, pitch, etc., from Pott's first description of chimney sweeps' cancer in 1775 to date, and reviews his own work with cancers induced in mice by painting the back with coal tar. He has been more constantly successful in this line than others so far, fully twenty-four of his twenty-six mice developing carcinoma (carcinoma-sarcoma in two) and the other two developing papillomas. One carcinoma was transplanted through four generations in four months, with 'takes' in from one to six of the animals in each generation. In Fibiger's 100 cases of spiroptera cancer in the mouse stomach he found only one that had induced metastasis in glands. [A more recent communication from Fibiger reports metastasis in twenty-two of eighty-six mice with tar carcinomas or sarcomas. The metastasis was in the axillary glands and lungs in most of the animals but occasionally in the heart or glands elsewhere. The young mice developed the cancers as readily as the older mice. He adds that Seedorff in his institute at Copenhagen has succeeded in inducing an actual adenocarcinoma in the mammary gland of a mouse treated with minute amounts of tar over a long period; this is the first experimental mammary adenocarcinoma to be published. Fibiger remarked that these tar cancers put the finishing stone to Virchow's theory of the causal importance of irritation in cancer, but the fact that cancers do not invariably develop proves that a predisposition is indispensable. There seems to be also an organ predisposition; he has never succeeded in inducing a spiroptera cancer in the esophagus of the animals, in his hundreds of attempts. Only the stomach develops these spiroptera tumors. He adds that it is dubious whether even aberrant embryonal cells are capable of developing cancer without some extraneous irritation to start them to malignant growth. His article appeared in the *Deutsche medizinische Wochenschrift* of Dec. 1 and 8, 1921.]

"He cites about fifteen research workers who between 1889 and 1916 had been striving to induce malignant tumors by repeated application of pitch, tar, anilin, etc. All were on the right track, but none kept up the experiments long enough until the Japanese reported in 1918 their success in twelve of 200 rabbits, with glandular metastasis in three. Fibiger and Bang have obtained positive results in 90 per cent. of the white mice which survived for at least three months after the first painting with the tar. Tsutsui has reported 50 per cent. of 'takes,' and Bierich up to 60 per cent. Rabbits seem to be less susceptible than white mice. The attempts to induce sarcoma of the liver in rats with cysticercus infection have always failed although sarcoma of the liver is comparatively common in wild rats infested with cysticercus. Only one instance is known in a house mouse."—C. K. Drinker.

EXPERIMENTAL PRODUCTION OF TAR CARCINOMA. *B. Lipschütz*. Wien. klin. Wchnschr., Dec. 22, 1921, 34, No. 51, 613-614.—Painting of gray mice with coal tar resulted in the production of tar carcinoma in about 45 per cent. of the mice. The first distinct macroscopic changes were observed in from 88 to 125 days. Transplantation of the warty neoplasm was successful in two instances. There is a marked increase in the skin pigmentation of the animals, even in those not painted with tar, but having tissue transplants. A peculiar cyst formation occurring in one animal is described.—Barnett Cohen.

DUST HAZARDS AND THEIR EFFECTS

DRILLING AND DUSTINESS OF METAL-MINE AIR. *D. Harrington*. U. S. Bur. Mines, Reports of Investigations, Serial No. 2339, March, 1922.—"The dust studies to date in metal mines of the United States by the U. S. Bureau of Mines indicate definitely that wet drills as used in drilling of all classes of holes aid decidedly in reducing dustiness

of air in drilling places. However, it has been found that wet drills whether of the Leyner type or stopers, if not operating satisfactorily or if out of repair, may throw into the air of working places a mist or fog laden with minute mineral particles, which when breathed has the same effect as dry dust and is fully as dangerous. In addition to danger when wet drills are not efficiently used, if water or compressed air and water forced through the drill is under excessive pressure, say over 100 pounds per square inch, there may be danger of escape of mist or fog laden with mineral particles, hence these pressures should be held below 100 pounds per square inch which, in general, is the practice in the United States.

"Wet drills must be kept in repair and must be operated with intelligence; as far as proved by the sampling of the U. S. Bureau of Mines, the wet drills, even when at their worst, still give conditions much more healthful than do dry drills."—M. C. Shorley.

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

Facts on Tuberculosis in Czechoslovakia. *Jaroslav Hülka.* Prague, 1922.—This publication is a study of tuberculosis in the Czech Provinces and in other countries. It contains thirty-three excellent diagrams and maps in which the prevalence of the disease is exhibited. Interest attaches to the fact that in Czechoslovakia, where industrialism is a comparatively recent development, the curve of tuberculosis by age periods closely resembles that which prevailed in England in 1851; it supports the contention that industrial development is associated with an increase of tuberculosis which especially affects young adult life. The disease in the Czech Provinces is most prevalent where industrialism is most prevalent. In the seventies Silesia, which is now particularly industrial, had the lowest mortality, and Moravia the highest. Today Silesia stands highest. When the thirty-two cities of the Czech Provinces are arranged according to tuberculosis death rates, those which are industrial stand at the top of the list.

The effect of the world war upon the disease is shown. It caused a rise in different countries and towns which was proportional to the stringency of food supplies. Tuberculosis is now on the decline in the Czech Provinces, but the incidence remains far higher than that experienced in other countries, such as England and America. The type of the disease resembles that found elsewhere, both in the way in which it attacks males and females, and in that about 83 per cent. of all tuberculosis deaths are due to pulmonary tuberculosis.—E. L. Collis.

Chronic Infectious Arthritis: Statistical Report, with End-Results. *Frank Billings, George H. Coleman,* and *William G. Hibbs.* Jour. Am. Med. Assn., April 15, 1922, 78, No. 15, 1097-1105.—This paper is an analysis of the age of incidence, duration, occupation, type of joint involvement, foci of infection, bacteriology, treatment, and end-results in 411 cases of chronic arthritis under observation between 1905 and 1921. The conclusions reached are as follows:

"This clinical investigation confirms and substantiates the present point of view of a majority of clinicians who have had the opportunity to make a careful investigation of chronic deforming arthritis, that it is primarily an infectious disease, and that the infectious micro-organisms which are the cause are usually strains of nonhemolytic streptococci of relatively low virulence, or occasionally strains of nonpyogenic gonococci or even of other bacteria of mild pathogenicity.

"The cause of the remarkable transformation of the fibrous tissues which enter into the joint structure and also of muscle tendons, into bone, is an interesting subject for future investigation. If the remarkable results of the animal experiments reported by Oxhausen can be substantiated, it may be possible to apply preventive measures which will obviate these disabling, irremediable secondary morbid changes."—C. K. Drinker.

THE RÔLE OF TRAUMA IN LESIONS OF SYPHILIS: WITH PARTICULAR REFERENCE TO THE HEREDITARY TYPE. *I. Harrison Tumpeer.* Jour. Am. Med. Assn., Jan. 21, 1922, 78, No. 3, 185-187.—The author summarizes as follows:

"1. Trauma may excite lesions in individuals with acquired syphilis whose infection is dormant.

"2. Bone changes, gummas of the soft tissues and paretic brain changes are the usual manifestations.

"3. Trauma may act as the exciting cause in the production of lesions in individuals with hereditary syphilis whose infection is dormant and even unsuspected.

"4. A girl with hereditary syphilis, possibly of the third generation, developed epileptiform seizures and mental disturbances following a head injury causing coma.

"5. Her half brother, likewise infected, developed primary optic atrophy following similar trauma. The healing of the fracture produced by the same injury was markedly retarded."

In conclusion he states:

"Trauma may incite the localization of a syphilitic lesion in an individual with a quiescent infection, acquired or hereditary, probably by producing a locus minoris resistantiae."—C. K. Drinker.

HEMORRHAGIC MENINGO-ENCEPHALITIS IN ANTHRAX: REPORT OF CASE. *B. Shanks.* Abstracted as follows from Indian Med. Gazette, Nov., 1921, 56, No. 11, 418, in Jour. Am. Med. Assn., Jan. 21, 1922, 78, No. 3, 247.—"The case described by Shanks illustrates the characteristic and interesting hemorrhagic lesions which occur in the meninges and brain as a result of their infection with the bacillus of anthrax. In this case an anthrax bacteriemia resulted from a malignant pustule of the face, and gave rise to secondary lesions in the brain, intestines, and parotid."—C. K. Drinker.

OBSERVATIONS ON AN EXTENSIVE HUMAN INFECTION BY SARCOPTIC MANGE OF THE HORSE. *R. A. S. Macdonald.* Lancet, April 15, 1922, 1, No. 15, 730.—It was found necessary to kill a horse suffering from generalized sarcoptic mange. The carcass was used by a class of veterinary students for such purposes as palpation, dissection, operations, etc. The time spent on this work, by each individual, varied from two to four hours.

With the exception of those students who were mere onlookers, or were engaged on the head and neck, parts which had been cured by treatment, all suffered from a most pronounced and continuous itching. The forearms, ankles and calves were affected by the typical papular rash. Each papule was the size of a large pinhead, slightly elevated and of a fiery red color. The hands sometimes escaped the eruption because they were frequently washed with carbolic soap. Some of the students developed secondary lesions on the trunk, thighs, shoulders, and upper arms.

The highly contagious nature of the disease being recognized, treatment was undertaken on the earliest appearance of symptoms. Hot scrubbing baths followed by sulphur ointment applications rapidly cured the cases. Clothing was at once cast off and disinfected. Where this last precaution was neglected reinfection took place.

Sarcoptes scabiei were found on the carcass in abnormally large numbers. It is suggested that these mites migrated from the dead and chilling equine to the human hosts and set up irritation in from two to twenty-four hours.—R. Prosser White.

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

DO WE NEGLECT THE INDUSTRIAL SKIN SUFFERER? *R. Prosser White.* Jour. State Med., Feb., 1922, 30, No. 2, 47-59.—In the treatment of dermatitis Dr. White points to the importance of preserving intact the epidermis and the sebaceous glands, which are the natural defences of the skin, while eradicating the causative bacilli—*e.g.*, streptococci and staphylococci. The excess of oily secretion and increased pigmentation in dark colored races enable them to withstand excessive moisture and heat.

The poison which is the cause of so many cases of industrial dermatosis is introduced

through the sudoriparous pores and hair follicles. Thus soot, arsenic, fulminate of mercury, fulminate of silver, mercurous nitrate, thorium, phosphorus, etc., and various bacilli form the *fons et origo mali.*

Four points of supreme importance are emphasized: (1) In handling chemicals, carelessness is a common cause of cutaneous disease. (2) Great care should be taken by the physician to distinguish industrial dermatitis from ordinary dermatitis, as the diagnosis is sometimes difficult. (3) The physician should seek for the cause when cure is delayed; nature will effect a cure if the source of irritation is removed. (4) The user of any commodity should realize his risks and responsibilities.

In this useful but all too brief contribution to industrial dermatology, Dr. White omits many interesting details which he discusses at length in his well-known work on "Occupational Affections of the Skin."—D. A. Coles.

THE EXTRACTION OF NON-MAGNETIC FOREIGN BODIES FROM THE ANTERIOR CHAMBER OF THE EYE. *William F. O'Reilly.* Boston Med. and Surg. Jour., March 30, 1922, 186, No. 13, 418-419.—The most common non-magnetic organic and inorganic foreign bodies finding lodgment in the anterior chamber are: copper, glass, wood, stone, paper, lead, gunpowder, brass, clothing, bone, celluloid, cement, lime and slate. A 2-inch strand of horse hair is looped, sized, moulded and bent to suit the individual case. The usual low non-posterior lip keratotomy is made nearest the foreign body. The hair loop is inserted, passed over the foreign body and gradually drawn out.—Barnett Cohen.

BUTYN, A NEW SYNTHETIC LOCAL ANESTHETIC: REPORT CONCERNING CLINICAL USE. *Albert E. Bulson, Jr.* Jour. Am. Med. Assn., Feb. 4, 1922, 78, No. 5, 343-345.—"The results of the clinical and experimental use of butyn seem to justify the committee in arriving at the following conclusions:

"1. It is more powerful than cocain, a smaller quantity being required.

"2. It acts more rapidly than cocain.

"3. Its action is more prolonged than that of cocain.

"4. According to our experience to date, butyn in the quantity required is less toxic than cocain.

"5. It produces no drying effect on tissues.

"6. It produces no change in the size of the pupil.

"7. It has no ischemic effect and therefore causes no shrinking of tissues.

"8. It can be boiled without impairing its anesthetic efficiency."—C. K. Drinker.

OCCURRENCE AND PREVENTION OF INDUSTRIAL ACCIDENTS

SAFETY ENGINEERING AS APPLIED TO OXY-ACETYLENE CUTTING AND WELDING APPARATUS. *F. J. Napolitan.* Safety Engin., Jan., 1922, 43, No. 1, 1-12.—This is a very complete discussion of the many phases of oxy-acetylene cutting and welding apparatus. The potential power of such apparatus requires that the most carefully designed devices be applied to it and made as ultimately safe as possible.—R. M. Thomson.

THE DEVELOPMENT OF SAFETY IN THE RUBBER INDUSTRY. *W. H. Larkin, Jr.* Safety Engin., Feb., 1922, 43, No. 2, 44-49.—This paper gives a review of some of the more ordinary things that have been done in recent years for the cause of safety in rubber mills, with a discussion of how safety work is carried on and of the methods used to present ideas of safety to the employees.—R. M. Thomson.

ABSTRACT OF THE LITERATURE

OF

INDUSTRIAL HYGIENE

VOLUME IV SEPTEMBER, 1922 NUMBER 5

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GENERAL

LIST OF PUBLICATIONS ON INDUSTRIAL HYGIENE.—The Industrial Health Section of the International Labour Office intends shortly to begin issuing, at regular intervals, lists containing information regarding publications dealing with industrial hygiene. The International Labour Office therefore requests all scientists and members of the medical profession, who are interested in social and industrial medicine, to be good enough to furnish its Health Section (Industrial Health Section, International Labour Office, Geneva) with detailed bibliographical notes on their recent publications (the author's name, the title of the article, and the date and number of the periodical in which it appeared); and to forward, if possible, a reprint of such articles. In return, the International Labour Office will be pleased to supply its correspondents regularly with its bibliographical lists on industrial hygiene.

VOCATIONAL GUIDANCE. *E. Gauthier.* Internat. Labour Rev., May, 1922, 5, No. 5, 707-722.—The writer, who is Director of the Regional Employment Office of the Ministry of Labor in Paris, has written a brief summary of the development of vocational guidance from its beginning in the United States, and has traced its history in England and the chief countries of the Continent. The need of vocational guidance is discussed at length. The conclusion is reached that whether we regard the problem from the economic, national, or social standpoint, there is great advantage in the vocational selection of boys and girls be-

fore they become technically specialized, in order to give to every one of them instruction from which he can draw the greatest benefit, and to which his strength, health, and intelligence are best adapted.—G. E. Partridge.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

Poisoning by Shoe Dye. *R. E. Cloud.* Jour. Am. Med. Assn., Jan. 28, 1922, 78, No. 4, 280.—"Nellie M., aged 3 years, had her shoes dyed at 5 o'clock in the afternoon. At 8 the same evening, the mother noticed some blueness of the lips, and at 8.30, when I saw her, her appearance was alarming; the face and hands were very pale, and the lips and finger nails markedly cyanotic. The child was irritable and behaved as if tired. The pulse was 134, heart action regular but agitated, and there was a systolic murmur, heard all over the precordium. The temperature apparently was not elevated, and there were no respiratory or gastro-intestinal symptoms. The eyes, mouth and throat were negative except for cyanosis of the lips and tongue. During examination, the odor from the freshly dyed shoes was very noticeable. With fresh air and rest in bed during the night, the cyanosis gradually cleared up, and the next morning the appearance and condition of the child showed nothing abnormal. When seen again a week later she was perfectly well, and there had been no return of the cyanosis."—C. K. Drinker.

Occupational Poisoning by Arsenobenzenes. *Slosse.* Abstracted as follows from Bull. de l'Acad. roy. de Belgique, 1921, Vol. 1, 416-428, by M. Heidelberger in Chem. Abstr., March 10, 1922, 16, No. 5, 754-755.—"Intoxications with varying manifestations and of varying intensity were observed among the physicians and attendants administering As antisyphilitics. Tests were made by Strzyzowski's modification (*Oesterr. chem. Ztg.*, 1904, No. 4) of the Marsh test. Arsenic was found in the blood in four out of six cases, while normal controls showed none. In 1-g. samples of cleaned and degreased hair all the subjects showed As, which can not be detected in 1 g. of hair from normal persons. In nails 0.05-0.3 g. was sufficient to give a positive test. Hippuric (A) and glucuronic (B) acids in the urine were higher than normal, which is taken to indicate the presence of the benzene part of the arsenobenzenes in the organism. Tests with respired air showed that the substances were not absorbed in this way, but a normal patient in whose socks arsenobenzene was placed showed a rapidly increasing amount of urinary A and B and gave a positive blood test, showing that absorption took place through the skin."

Manganese a Neglected Remedy. *L. J. Boyd.* Abstracted as follows from Jour. Am. Inst. Homeopathy, 1921, Vol. 14, 409-415, by Joseph S. Hepburn in Chem. Abstr., March 10, 1922, 16, No. 5, 755.—"From the pharmacology and toxicology of manganese, the conclusion is drawn that the symptomatology and possible pathology of chronic manganese poisoning is very closely similar to paralysis agitans, progressive lenticular degenerations, and pseudosclerosis. A bibliography is appended."

The Blood Chlorides in Mercuric Chloride Nephritis. *J. A. Killian.* Abstracted as follows from Jour. Lab. and Clin. Med., 1921, Vol. 7, 129-133, by E. R. Long in Chem. Abstr., March 10, 1922, 16, No. 5, 748.—"Two non-fatal cases of $HgCl_2$ poisoning are reported. Both cases presented evidence of severe N retention. As the impairment of renal function due to kidney injury progressed, a diminution of concentration of the chlorides of whole blood was noted. A return to normal of the functional capacity of the kidneys was accompanied by an increase in the blood chlorides."

The Treatment of Acute Phosphorus Poisoning. *H. V. Atkinson.* Abstracted as follows from Jour. Lab. and Clin. Med., Dec.,

1921, 7, No. 3, 148-150, by E. R. Long, in Chem. Abstr., March 20, 1922, 16, No. 6, 965.—"Advantage is taken of the relatively high solubility of phosphorus in oils which are not absorbed. Liquid petrolatum given to a dog one hour after administration *per os* of the fatal dose of phosphorus furnished complete protection against the poison. The petrolatum acts entirely through its physical properties as a non-absorbable, non-irritating cathartic."

CONTRIBUTION TO THE STUDY OF THE SO-CALLED FATTY DEGENERATION OF THE LIVER IN INANITION AND IN PHOSPHORUS POISONING. *I. Salvioli* and *I. Sacchetto.* Il Lavoro, Dec. 31, 1921, 12, No. 8, 229-230.—In a paper read before the Royal Institute of the Sciences and Arts of Veneto, August 21, 1921, Salvioli and Sacchetto reported the results of their histologic and microchemical researches in this field.

1. In the liver of fasting dogs there is a gradual disappearance of those neutral fats which are found in normal animals, and in their place is noted the appearance of droplets of lipoids in marked quantity, especially if the fast is pushed to extremity.

2. The liver of normal guinea-pigs contains certain cells not described by other authors, a little more voluminous than ordinary liver cells and containing droplets of lipoids mingled with a few droplets of neutral fats.

3. These cells with their lipoid content are markedly increased in the liver of fasting guinea-pigs even after a short period of fasting.

4. If dogs, after a long period of fasting, are poisoned with phosphorus, the liver takes on the character of typical fatty degeneration except that in the liver cells, in addition to the neutral fats, a certain quantity of lipoids is also found.

5. In the liver of non-fasting dogs poisoned with phosphorus only neutral fats are found.

6. In guinea-pigs poisoned with phosphorus, whether fasting or not, the liver presents the characters of fatty degeneration, but microscopic examination shows that while all the cells contain a great quantity of neutral fats, there is also an increase of the large cells with lipoid content already described in the liver of the normal guinea-pig.—Alice Hamilton.

THE ACTION OF CYANAMID. *E. Hesse.* Abstracted as follows from Ztschr. f. d. ges. exper. Med., 1921, 25, p. 321, in Med. Science, May, 1922, 6, No. 2, 164.—"In connection with cyanamid, which has attained such great importance as an artificial fertilizer, it has been found that persons working with it are attacked by fleeting exanthemata of the head and chest. There is rapid breathing, increased heart action, and low blood-pressure. The attack lasts an hour or two. The curious feature of the attack is that it only comes on when the patient has consumed alcohol in some form.

"It has been thought that alcohol increases the toxic effect of cyanamid, which is by itself considerable. This, however, is not the case.

"Cyanamid is able to energize the action of a number of substances such as chloral hydrate, sodium bromide, theobromin, etc. For example: if a guinea-pig be given a small amount of sodium bromide which is physiologically inactive, followed by a small dose of cyanamid, there is an immediate action as if the animal had been poisoned by a large dose of bromide. In an experiment on a man a dose of cyanamid was taken in the morning, and in the evening, when the experiment had been quite forgotten, the subject took a glass of beer. The typical symptoms came on, the attack lasting six hours. The practical results are obvious, in that all persons working with this fertilizer should abstain from the use of all alcoholic drinks."—M. C. Shorley.

LAWS AND REGULATIONS RELATING TO LEAD POISONING. *Gilbert Stone.* London, H. M. Stationery Office, 1922, pp. 247.—This volume which has been prepared for the Governors of the Imperial Mineral Resources Bureau brings together under one cover all legislation aimed at the prevention of industrial lead poisoning. The text of laws and regulations at present in force in different countries forms two-thirds of the book. This part is prefaced by a general analysis in which the scope of the enactments and the objective aimed at in each case are stated. The metal is followed from mining

of its ores, in which, to judge from the scarcity of legislation, there appears to be little risk of poisoning; through the smelting of materials containing lead, which is more or less stringently controlled in many countries; to the manufacture of white lead, which has long been recognized to create risk and to need legal supervision; and, finally, to the use of lead compounds in such varied occupations as the manufacture and use of paints, the pottery industry, the making of electric accumulators, the tinning of metal articles, vitreous enamelling, heading of yarn and file cutting. Regulations controlling the use of bronze powders in printing works are also included; as these powders do not contain lead, however, the reason is not clear.

Only a short chapter is devoted to legislation providing compensation for lead poisoning and it cannot be described as other than unsatisfactory, especially as the author is a barrister; we learn from it nothing as to procedure and only a little as to effect. Perusal of the book indicates that of all countries the code for preventing lead poisoning is most thorough in Great Britain, although even here there is a vacancy with regard to the house painting industry; this vacancy, however, should shortly be filled when action is taken in conformity with the international agreement recently reached at Geneva. On the other hand, the United States appears to have established legislation only in New Jersey and for lead smelting alone; this state of affairs is the more surprising on account of the reports of Dr. Alice Hamilton upon the incidence of lead poisoning in the United States.

The effect of legal enforcement of preventive measures is illustrated by instances taken from Great Britain, where in the white lead industry an annual attack rate of 183 for the period 1900-1904 was reduced to one of seventeen for the period 1915-1919; and in the pottery trade, where an annual attack rate of 357 for the period 1896-1900 was reduced to one of nineteen for the period of 1915-1919. These falls occurred while the number exposed to risk was increasing, owing to trade expansion, and while the tendency to report mild cases was greatly increased, owing to the Workmen's Compensation Act of 1906; thus, of all cases reported between the years 1900-1904, 33.2 per cent. were severe, and 20.8 per cent. were moderate, as contrasted with 18.4 per cent. severe and 32.2 per cent. moderate between the years 1910-1914. This publication will be found of great value by all interested in the legislative control of industrial disease.—E. L. Collis.

Lead Poisoning, with Special Reference to Poisoning from Lead Cosmetics. *M. Barron* and *H. C. Habein.* Abstracted as follows from Am. Jour. Med. Sc., Dec., 1921, 162, No. 6, 833, in Jour. Am. Med. Assn., Feb. 4, 1922, 78, No. 5, 362.—"In the cases reported by Barron and Habein a powder containing pure lead carbonate, ground to an impalpable powder used as a face powder, was responsible for the lead poisoning. It is urged that rigid laws be enacted prohibiting the sale of any compound containing lead for cosmetic purposes."

Lead Poisoning in Making Batteries. *F. Heim, A. Agasse-Lafont,* and *A. Feil.* Abstracted as follows from Presse méd., Feb. 1, 1922, 30, No. 9, 92, in Jour. Am Med. Assn., March 25, 1922, 78, No. 12, 927.—"This article is the report of a committee which has been investigating lead poisoning among ninety-six persons employed in making storage batteries. Basophil granulation in the erythrocytes and lead in the urine are the most reliable signs of even incipient lead poisoning."—C. K. Drinker.

Keeping Spray from Workmen. Factory, Feb., 1922, 28, No. 2, 226.—"The Liberty Motor Car Company has recently installed a system for taking care of paint spray. Above the painter's den is placed a hood through which the paint spray is sucked by a motor-driven fan on top. The painter wears goggles as he sprays the black enamel over the automobile frame. The frame moves along the assembly line into big, long ovens where the paint is baked onto the metal."

An illustration is included which gives some idea of the size of the machinery overhead, and how the suction can guard the worker's health.—M. C. Shorley.

DUST HAZARDS AND THEIR EFFECTS

THE SUGAR-TUBE METHOD OF DETERMINING ROCK DUST IN AIR. *A. C. Fieldner, S. H. Katz,* and *E. S. Longfellow.* U. S. Bur. Mines, Tech. Paper No. 278, 1921.—The apparatus, set-up, and procedure are almost identical with that used by the same authors in determining the efficiency of the Palmer dust sampler. (See THIS JOURNAL, 1920-1921, *2*, 167.) The efficiency of the sugar filters recommended by the authors was found to increase for fine particles such as tobacco smoke when the sugar was moistened with water or dilute alcohol, and when powdered instead of granulated sugar was used. The general technic in the use of the filters was that conventionally in use. Gravimetric efficiencies were determined by drawing very small quantities of fine silica dust from small dust cloud producers which were weighed before and after the dust had passed to the sugar filters, the decrease in weight being caused by dust entering the sugar filter. The dust collected in the tubes was weighed in the usual manner, blanks being run to determine the water-insoluble matter in the sugar. Gravimetric efficiencies were found to range from 70 to 95 per cent. Optical efficiencies were determined in a Tyndall meter by matching streams of known smoke content against the exhaust from the sugar tubes, and were found to be 23 to 60 per cent. with the standard Bureau of Mines sugar tube. By using greater depths of sugar, by using powdered instead of granulated sugar, and by varying the diameters and hence the filtering surface, the optical efficiencies were markedly increased, ranging as high as 92 per cent. over fifteen-minute periods.

The paper is replete with examples of accomplished ingenuity and technic and, with the authors' earlier paper, forms an important contribution in this field of research.—P. Drinker.

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

THE ECZEMA OF MASONS. *Mario Artom.* Il Lavoro, Dec., 1921, 12, No. 8, 225–229.—One of the most common forms of industrial dermatosis is the eczema of masons, affecting, according to Martial, at least one-third of the individuals who work with lime and cement, although few of them come under the eyes of the dermatologist, since the disease is seldom severe. A predisposing cause is the humidity to which the hands of masons, especially plasterers, are continually exposed, and the consequent maceration of the horny layer of the skin, also the frequent abrasions caused by the nature of the work. Lime and the alkaline bases and alkaline earths in non-hydrated form provoke the dermatitis. In the case of cement the author believes that, in addition to potash and soda, aluminum and sulphuric acid favor the formation of dermatitis. The seat of the lesions is always on the hands, especially between the fingers; the palm is almost never affected, even when the eruption covers all the dorsum. Next in order come the forearm, the upper arm, the axilla, the chest in those who work with the chest exposed, and, in one case only, the face. The course may be slow or rapid, and, if the latter, there may be an edematous infiltration. Itching is usually very marked and leads to scratching which may result in suppuration. In some cases there is a formation of indurated pigmented plaques having the appearance of lichenoid eczema.—Alice Hamilton.

TREATMENT OF ACNE ARTIFICIALIS BY ARTIFICIAL SUNLIGHT. *L. Wertheim.* Abstracted as follows from Dermat. Wchnschr., Sept. 24, 1921, 73, 1005, in Arch. Dermat. and Syph., May, 1922, 5, No. 5, 634.—"Two cases of occupational dermatitis (oil acne) are reported by the author. Cures were effected by a few intensive doses of ultraviolet light."

TRAUMATIC DYSCHROMATOPSIA. *Francesco Cioffi.* Il Lavoro, March 31, 1922, 13, No. 3, 65–72.—Cioffi is chief physician of the state railways in Italy. He discusses the occurrence of color-blindness after accidents, as reported by numerous writers, and describes his own observations on railway workers.

Among 8,000 railway workers and applicants for such work whom he examined, he found about 200 color-blind. It is the rule of the railway administration to repeat such

examinations after accidents involving injuries to head or to eyes. Cioffi has never found any alteration of color perception as the result of accidents of this kind. He discusses further the question of including under the compensation law traumatic color-blindness, the existence of which he does not dispute, since an accident of this character would affect the earning powers not only of railway workers and sailors but of painters, decorators, dyers, tile workers, and salesmen of all sorts of goods, as well as makers of clothing.—Alice Hamilton.

INFLUENCE OF FATIGUE ON THE PERCEPTION OF COLORS. *Rolandi.* Abstracted as follows from Giornale della R. Accademia di Torino, 1921, No. 5-6, in Il Lavoro, Feb. 28, 1922, 13, No. 2, 52.—Rolandi reports interesting results of tests made at a high altitude—at the Mosso Institute on the Col d'Olen—concerning the influence of fatigue on the color perception of seven individuals. At this height a march of four to nine hours over the glaciers is followed by a loss of ability to distinguish colors. Rolandi attributes this effect to fatigue, and states that the more extreme the exhaustion the greater is the extent of colored surface needed to permit of any color perception. The degree of loss varies with different colors, the greatest loss being caused in the perception of yellow, which has the most ample visual field, and losses of decreasing degree being caused in the perception of blue, violet, and red. The loss is least in the perception of green, which of all the colors has the most restricted field.—Alice Hamilton.

OCCURRENCE AND PREVENTION OF INDUSTRIAL ACCIDENTS

LAMP ROOM ORGANIZATION AND THE UPKEEP OF SAFETY LAMPS. Rep. (British) Miners' Lamps Committee, No. 6.—Early in this report the committee states that it has clear evidence that a poor light increases the risk of accident and disease and adversely affects output. The committee lays great stress on the careless treatment of lamps in the colliery lamp rooms and calls for substantial improvement in lamp room organization. The lamp room should be treated as one of the primary establishments of the colliery.

The recommendations are summarized in twenty-six short paragraphs, of which the most revolutionary are: *(a)* the certification of head lampmen after examination by a board of examiners; *(b)* the instruction of every person newly employed underground by the head lampman or chargeman in the precautions necessary for the safe and efficient use of his safety lamp; *(c)* the issuing of printed instructions relating to the care and use of the particular type of lamp which the new employee is to use.

The report has been well received by the colliery journals, and the Colliery Guardian states, "It is, indeed, probably the most complete and practical document that has emanated from any committee within recent years."—T. L. Llewellyn.

FINGER GUARDS ON PRESSES. *H. J. Scholte.* Zentralbl. f. Gewerbehyg., 1921, 9, No. 12, 294-295.—The author reports on a finger guard for presses, invented by J. D. Filarski, an inspector in Amsterdam. The ordinary foot feeder is replaced by a hand feeder. The left half of the stamper is guarded by a stiff perforated plate, so that it is entirely inaccessible to the worker's left hand. The pieces to be inserted in the press are taken in the left hand, passed to the right, then placed under the stamper. Then the right hand presses down the lever, and while the stamper descends, presses, and goes up again, this hand takes a new piece which the left hand has all ready for it.

The introduction of this device did not slow up production; in fact, the men doing piecework made better wages because they could give more attention to the work when they felt safer. Statistics from one factory showed that during the month before its introduction there were five accidents, but that in nine months after the placing of the guards there were only four, in spite of doubling the number of machines and working two shifts. Moreover, these accidents occurred in persons who were unsuited to this kind of work.

A very clear photograph accompanying the article shows how the device is attached to the machine.—H. G. Noyes.

INVESTIGATING DUST EXPLOSIONS TO PREVENT THEIR RECURRENCE. *D. J. Price.* Nat. Safety News, March, 1922, 5, No. 3, 14-16.—Thirteen explosions in the United States between 1913 and 1921 exacted the following toll: more than 150 lives; more than 200 injuries; more than $15,000,000. Twelve of these explosions occurred between 1916 and 1921. Many industries were affected—not only grain, but the metal, chocolate, and sugar industries.

Disastrous explosions arose from the most trivial causes, such as sparks from a piece of metal, a broken electric bulb, static sparks. In this article Mr. Price describes the work done by the Bureau of Chemistry of the United States Department of Agriculture to help solve this problem.—M. C. Hamblet.

INDUSTRIAL SURGERY

INFECTION IN INDUSTRIAL INJURIES. *F. J. Cotton.* Hosp. Management, Feb., 1922, 13, No. 2, 59-60.—The writer lays emphasis on these factors as causes of still prevalent sepsis in industrial injuries: lack of prompt attention; personal uncleanliness; filthy surroundings; too early use of injured members; indifference; bad judgment (one must consider every case of accidental wound as already infected and so treat it); bad technic (largely due to indifference and poor judgment).

Technic should conform to certain principles: wide exposure of wound surfaces; removal of devitalized tissues; prolonged contact with the chosen mild antiseptic; open drainage or, at the most, a loose suturing of the surface.

The article contains a brief but important discussion of the use of Carrel-Dakin solution. The recommendation is made that hospitals and physicians should in some way be checked up in regard to their results in the field of infection in industrial injuries.—G. E. Partridge.

SPRAIN AND SUBLUXATION OF WRIST. *E. Destot.* Abstracted as follows from Lyon Chir., Sept.-Oct., 1921, 18, No. 5, 659, in Jour. Am. Med. Assn., Jan. 21, 1922, 78, No. 3, 249.—"Destot refers to what he calls scapho-semilunar subluxation, as well as simple sprain, and tells how to recognize and treat both. He prefers immobilization for five or six days with a stiff cardboard splint, leaving the fingers free, rather than massage or rubbing. Compression with cotton aids in resorption of exudation. The hand should slant toward the ulnar side, and be slightly flexed. The subluxation can usually be reduced with the thumb, pushing on the foveola radialis. With recurring subluxation, a laced leather cuff can be worn."—C. K. Drinker.

STIFF FINGERS. *F. J. Cotton* and *E. J. Sawyer.* Abstracted as follows from Boston Med. and Surg. Jour., Feb. 9, 1922, 186, No. 6, 183, in Jour. Am. Med. Assn., March 4, 1922, 78, No. 9, 682.—"Twenty-four hour traction, by miniature winches or by pull of elastic bands, traction exerted in the line of deformity to produce a distraction of joint surfaces, with very gradual change of the line of pull toward flexion or toward extension as the case demands, Cotton and Sawyer claim, will so supplement ordinary physiotherapy methods or so displace them that stiff hands and fingers may possibly come to be rare and come to be regarded as perhaps a reflection on the treatment of the case rather than as the result of the 'Act of God' clause under which surgeons, perhaps, even like the express companies, are a little too much inclined to explain their losses."—C. K. Drinker.

MECHANICS AND TREATMENT OF FRACTURES OF THE FOREARM. *Paul B. Magnuson.* Jour. Am. Med. Assn., March 18, 1922, 78, No. 11, 789-794.—This article is a long and careful discussion of the anatomical and mechanical problems involved in treatment of fractures of the forearm. The author's discussion depends largely upon the illustrations, and the interested reader is referred to the original paper.—C. K. Drinker.

Fracture of Femur in Adults. *A. Charbonnier.* Abstracted as follows from Lyon Chir., Sept.-Oct., 1921, 18, No. 5, 625, in Jour. Am. Med. Assn., Jan. 21, 1922, 78, No. 3, 249.—"Charbonnier analyzes eighty-eight cases of fracture of the femur in Kummer's service, 1916 to 1919, comparing the outcome with different modes of treatment. Nail extension gave excellent results in 84.5 per cent. of the cases in which it was applied, and no serious by-effects were observed in any instance. The Steinmann nail extension method may be counted on, therefore, he says, to give excellent functional results, especially with fracture of the shaft of the femur, and it materially shortens the stay in the hospital. The few drawbacks of the method are amply compensated by the fine results it is capable of giving. Consolidation required from twenty-five to fifty days."—C. K. Drinker.

Studies in Experimental Traumatic Shock. IV. Evidence of Toxic Factor in Wound Shock. *W. B. Cannon.* Abstracted as follows from Arch. Surg., Jan., 1922, 4, No. 1, 1, in Jour. Am. Med. Assn., Jan. 21, 1922, 78, No. 3, 241.—"Aside from the experimental evidence presented by Cannon, which resulted in the building up of a theory of traumatic toxemia as a cause of shock, there are also clinical observations which extended over approximately the same period as the experimental studies, and which, quite independently, led to the same conclusion. The whole question of the nature of shock is discussed at length."—C. K. Drinker.

Experimental Traumatic Shock. V. Critical Level in Falling Blood Pressure. *W. B. Cannon* and *McKeen Cattell.* Abstracted from Arch. Surg., March, 1922, 4, No. 2, 300, in Jour. Am. Med. Assn., April 15, 1922, 78, No. 15, 1158.—"From their experimental results Cannon and Cattell conclude that the critical level, that is, the level at which the blood pressure is no longer capable of maintaining an adequate volume flow to the tissues, and thus serving the normal oxidations of the body, is approximately 80 mm. mercury. Above 80 mm. reduction of the alkali reserve is not likely to appear; but as the pressure falls below this, a reduction will probably occur, which is more marked and develops the more rapidly the lower the pressure. If there has been a loss of blood, the circulation becomes inadequate before the pressure falls to 80 mm. mercury, *i. e.*, the critical level is raised. Experiments also have definitely proved that with an acute lack of oxygen nerve cells abruptly cease to function. The experimental and clinical observations on the effects of prolonged low pressure point to the fact that these sensitive cells may be gradually harmed, if, instead of acute anemia, there is prolonged partial anemia. The authors emphasize the prime importance of early treatment of the low blood pressure of shock. Though the tissues may not suffer until blood pressure has fallen below a critical level of approximately 80 mm. mercury, it is desirable, when the pressure has fallen below this level and has shown no evidence of rising, that it be raised to the normal level of 120 mm. mercury, if possible, in order to provide the most favorable conditions for repair of the damage which has been done."—C. K. Drinker.

INDUSTRIAL PHYSIOLOGY: NUTRITION, METABOLISM, FATIGUE, ETC.

Sinistrality and Muscle Coordination in Musicians, Iron Workers, and Others. *C. Quinan.* Abstracted as follows from Arch. Neurol. and Psychiat., March, 1922, 7, No. 3, 352, in Jour. Am. Med. Assn., April 1, 1922, 78, No. 13, 1002.—"A study was made by Quinan of sixteen sinistral patients. Six admitted an unaccountable and capricious tendency to 'bump into things.' One is unable to 'reverse' in waltzing. Of five who had studied instrumental music, two had made fair progress up to a certain point but considered that they had accomplished little for the outlay of time and money. Both are hampered by a defective sense of tempo and find 'sight reading' an embarrassment. Two others abandoned the study of music because they were 'unable to make any headway.'

The remaining one is a talented player but states that she still finds it difficult to 'keep in time.' Of these five musicians, two are left handed and left eyed, one is left handed and right eyed, and two are right handed and left eyed. Five patients are free from motor symptoms. These patients seem to show: (1) that sinistrals are especially prone to various forms of muscle incoordination, and (2) that in some of these persons both the sense of equilibrium and the sense of rhythm are defective. Hoping further to elucidate the subject, a study of sinistrality in skilled manual workers was carried out. Three series of 100 men each, classified as (1) professional musicians, (2) machinists, and (3) male inmates of a public relief home, were also examined. Four per cent. of the machinists proved to be left handed and an additional 4 per cent. had sinistral peculiarities. In striking 8 per cent. of left handedness was found among the musicians while the lesser forms of sinistrality mounted to 24 per cent. It was evident from this research that left handedness and sinistrality usually are indicative of the psychopathic constitution.''—C. K. Drinker.

Increase of Globulins in Spinal Fluid. *H. Baar.* Abstracted as follows from Wien. klin. Wchnschr., Dec. 22, 1921, 34, No. 51, 614, in Jour. Am. Med. Assn., April 1, 1922, 78, No. 13, 1012.—''Baar made examinations in a number of organic and functional affections of the nervous system in childhood with respect to the behavior of globulins in the cerebrospinal fluid. He found an increase of the globulin content in many different cases. In uremic and eclamptic attacks, and especially in repeated spasmophilic convulsions, the globulin content of the cerebrospinal fluid attains the same degree as in tuberculous meningitis. In convulsions due to disturbances of functioning, the globulin content of the spinal fluid is greatest during the convulsive stage and drops after the convulsions cease, whereas in the case of tuberculous meningitis the globulin content increases from the beginning of the irritation stage until the fatal outcome. In a number of organic affections of the central nervous system which are of moment in the differential diagnosis of tuberculous meningitis, there was just as marked an increase in the globulin content as in the latter disease. However, the Pándy reaction, if conservatively interpreted, will render valuable service in differentiating tuberculous meningitis from clinically similar functional affections; particularly, a negative reaction is of importance. For the differential diagnosis as against organic diseases presenting a similar clinical picture to tuberculous meningitis, the value of the phenol reaction is only limited, and, in case of a positive reaction, only the continuous increase of the intensity of the reaction is significant.''—C. K. Drinker.

Diagnostic Value of Determining Vital Capacity of Lungs of Children. *May G. Wilson* and *Dayton J. Edwards.* Jour. Am. Med. Assn., April 15, 1922, 78, No. 15, 1107-1110.—The author concludes as follows:

''1. Vital capacity measurements should be recorded on routine physical examination.

''2. The determination of vital capacity of the lungs in children is indicated as a practical and valuable diagnostic measure.''—C. K. Drinker.

Relation between Fatigue and Susceptibility of Rats toward a Toxin and an Infection. *E. H. Oppenheimer* and *R. A. Spaeth.* Abstracted as follows from Am. Jour. Hyg., Jan., 1922, 2, No. 1, 51, in Jour. Am. Med. Assn., Feb. 25, 1922, 78, No. 8, 611.—''Oppenheimer and Spaeth found that fatigue, artificially induced in white and hooded rats by forcing them to run in motor driven drums, apparently tends slightly to increase their resistance to subcutaneous injections of tetanus toxin. This occurs whether fatigue precedes or follows the injection of the toxin. These results contradict the popular belief that a fatigued individual is more susceptible to disease (tetanus toxin and pneumococcus infection) than a non-fatigued individual.''—C. K. Drinker.

Influence of Fatigue on Certain Optic Phenomena. *E. H. Sanders.* Nederl. Tijdschr. v. Geneesk., Oct. 8, 1921, 2, No. 15, 1820-1836.—This article presents a technical discussion of the physiology of visual fatigue. —N. C. Foot.

HAZARDS OF COMPRESSED AIR, DIMINISHED PRESSURE, GENERATION AND USE OF ELECTRICITY, AND ELECTRICAL WELDING

ELECTRIC ACCIDENTS. *C. W. G. Mieremet.* Abstracted as follows from Nederl. Tijdschr. v. Geneesk., Nov. 26, 1921, 2, No. 22, 2678, in Jour. Am. Med. Assn., March 18, 1922, 78, No. 11, 855.—"Mieremet was impressed with the similarity between the local microscopic findings in burns from a strong electric current and burns from the action of fire. But the macroscopic picture may differ decidedly; only with the electric injury—and not always then—do we find the hard white patches resembling cartilage or stearin. These patches induced in rabbits were cast off after a few days, seventeen at most. This occurs also after clinical electric accidents, these injuries behaving differently in this respect from ordinary burns and other wounds."—C. K. Drinker.

LOW-VOLTAGE ELECTRICAL HAZARDS. *S. E. Whiting.* Safety Engin., Feb., 1922, 43, No. 2, 63-66.—This article gives a few cases of fatalities due to low-voltage circuits, that is, from 110 to 550 volts. The author emphasizes the need of proper grounding of starting boxes, motor frames, and switch cases. In damp locations, or in places where one's body can be well grounded, it is in the interest of safety to use reinforced cord, wooden handles and porcelain sockets on all extension cords.—R. M. Thomson.

THE CAUSE OF DEATH IN ELECTRICAL SHOCK. Brit. Med. Jour., March 25, 1922, No. 3195, 478-480. — This is a report of a discussion in the electrotherapeutic section of the Royal Society of Medicine, which was contributed to by Dr. T. M. Legge, Mr. Scott Ram, Mr. G. Levy, Dr. B. Spilsbury, and Prof. J. MacWilliam.

The majority of deaths due to electricity occur in factories, but some, owing to the carelessness shown in the construction of electric apparatus, occur among the ordinary public. Many interesting facts were reported, including the greater tendency of shock due to low pressure alternating currents (250 volts or less) to be fatal, than that due to currents of higher voltage.

Two views were put forward as to the cause of death: one, that of Jellinek, who holds that immediately after shock death is apparent rather than real, owing to the temporary paralysis of the respiratory center, and that recovery depends upon artificial respiration; the other, that of Boruttau, who holds that in the majority of cases death is real. In such cases the result may be due to ventricular fibrillation which, in animals at any rate, may pass off spontaneously and is not assisted by artificial respiration. The possibility of both paralysis of respiration and ventricular fibrillation being present at once was considered not unlikely.

The curious fact was stated that recoveries seem more frequent when the victim suffered from countershock, such as falling from a height after exposure to the current. Definite agreement as to the exact condition following shock was not arrived at, but as a measure of first-aid treatment, the practice of applying artificial respiration for an hour or more was recommended for adoption.—E. L. Collis.

HEAT, COLD AND HUMIDITY

VASOCONSTRICTION FROM WARMTH STIMULATION. *E. G. Martin* and *L. A. Jacoby.* Abstracted as follows from Am. Jour. Physiol., Feb., 1922, 59, No. 1, 394, in Jour. Am. Med. Assn., April 1, 1922, 78, No. 13, 1000.—"In nine out of eleven experiments made by Martin and Jacoby immersion of the lower part of the human body in water at about 45° C. was followed in seven seconds, on the average, by a drop in temperature of the skin of the small of the back averaging slightly less than 0.2° C. Accompanying this drop in temperature were well marked 'gooseflesh-ing' and sensation of chilliness. Martin and Jacoby interpret these findings as evidence that a large volume of nervous discharge, due to stimulation of a great many receptors for warmth, elicits, typically, reflex vaso-

constriction. This interpretation is opposed to the view that vasodilatation is the specific reflex response to stimulation of the end organs for warmth.''—C. K. Drinker.

NEPHRITIS FROM CHILLING. *F. Gaisböck.* Abstracted as follows from Wien. Arch. f. inn. Med., Nov. 15, 1921, 3, No. 1-2, 1, in Jour. Am. Med. Assn., April 8, 1922, 78, No. 14, 1094.—''Gaisböck in experimenting on rabbits found that acute inflammation of the kidney could be induced by direct chilling of the organ. Chilling to 9 or 10 C. induced nephritis of the glomerular-tubular type, while with chilling to 3 or 4 C. there were degenerative changes as well as inflammatory. The changes, however, seemed to be able to heal in time. Severing the splanchnic nerve or decapsulation beforehand did not seem to modify conditions, except that the latter was followed by proliferation of connective tissue, a traumatic nephritis. Inoculation with streptococci at the time of the chilling entailed an acute interstitial nephritis with changes in the glomeruli and entire parenchyma.''—C. K. Drinker.

THE HUMIDITY AND INSENSIBLE PERSPIRATION. *O. Moog.* Abstracted as follows from Deutsch. Arch. f. klin. Med., Jan. 24, 1922, 138, No. 3-4, 181, in Jour. Am. Med. Assn., April 8, 1922, 78, No. 14, 1092.—''Moog was surprised to find in tests of five persons that the insensible perspiration continued the same regardless of the greater or less humidity of the air. This could not occur if the insensible perspiration were merely an ordinary evaporation process. If this were the case, the amount of water cast off through the skin would diminish with increasing humidity, while the reverse of this was the rule in his tests.''—C. K. Drinker.

WOMEN AND CHILDREN IN INDUSTRY

IOWA WOMEN IN INDUSTRY. U. S. Dept. Labor, Women's Bur., Bull. No. 19, 1922, pp. 73.—During October, November, and December, 1920, an investigation was made of 223 firms in twenty-one cities, and data were gathered in regard to 10,411 women and 11,718 men employed in manufacturing plants, stores, restaurants, hotels, and laundries. The laws of Iowa do not require the keeping of employment records, and it was found that of the 223 firms (six not reporting), only fifty-four kept employment records of any kind.

There are no laws regarding the number of hours that a wage-earning woman may work. It was found that 2.8 per cent. of the women workers were working sixty hours a week, and in forty-four cases there was a week of eighty-four hours. Only 1.9 per cent. had a day shorter than eight hours. Many women worked overtime.

A study of the lunch periods in 193 establishments (restaurants not included), showed that sixty-seven had a thirty-minute period, and ninety-nine a sixty-minute period. Conditions in the restaurant business were especially poor, because of excessive hours of work, as a result of which the turnover is tremendous. Many women working in these places have home duties which they must fulfill in the scant hours left them from work.

More than one-half of the plants had no lunch rooms. Only seventy-four had any provision for resting, and regular rest periods were provided for in only a few establishments. Of the 223 plants, thirty-nine had no cloakrooms, and in 125 there was only cold water. Common towels were provided in 145 plants. There is a law requiring that a sufficient supply of water suitable for drinking purposes shall be provided. The facilities, in reality, vary all the way from the most sanitary to no provision at all. The common drinking cup was found in ninety-two establishments.

There is no law regulating lighting in Iowa industries, but the plants visited were found on the whole to use sufficient natural and artificial light. Iowa has no complete code regulating working conditions for women. In some establishments cleaning has been systematized, and janitor service and matron service were found to be excellent. In other establishments, however, conditions were poor, and in some instances the workers were made to act as the janitor force. In button factories it was found that nine of the ten plants were cleaned by the women

workers, although most of these women were on piecework.

Part II of the report deals with industrial opportunities and training. "Only five per cent. of the firms employed special people to devote their time to the instruction of workers and beginners." Among the industries other than mercantile, one printing firm had a personnel director, and there were several concerns having trade instructors. In 8 per cent. of the plants there were persons whose principal duty was to instruct others, although they were hired as operators.

The report ends with an account of trade extension work by the state. There are three maps and eight tables, and an appendix containing additional tabulated data.—G. E. Partridge.

THE INTERNATIONAL PROTECTION OF WOMEN WORKERS. Studies and Reports, Internat. Labour Office, Oct. 15, 1921, Series 1, No. 1. —The article contains a useful sketch of the history of protection of women workers up to the time of the Third International Labour Conference, which was to be held at Geneva in October, 1921.

The program of the Third Conference, as far as women's employment is concerned, is given. There were to be considered: the question of the adaptation to agriculture of the decisions made at Washington; special protective measures for agricultural laborers in connection with technical education, housing and sleeping accommodation, and the guarantee of right of association and combination; protection against accident, sickness, invalidity and old age; weekly rest days; the protection of women before and after childbirth; the night work of women in agriculture.

Questionnaires sent to the governments have brought information that indicates difficulty in applying maternity legislation to agriculture because of the heavy financial burden involved in its extension. Of the sixteen countries making replies up to the time of the report, only two—France and Spain—declared unreservedly in favor of the plan. A draft recommendation was, however, prepared for the Conference.

With regard to night work in agriculture it was found that it is practically non-existent in the case of women workers in agriculture, and the majority of the governments have signified that they are not in favor of applying to agriculture the Washington Convention concerning night work.

Several governments have recognized the need of providing adequate consecutive hours of rest for women in agriculture, so that they need not be called upon to attend cattle in the early morning after doing housework late at night. A draft recommendation to that effect was therefore prepared, asking for a rest period of not less than nine consecutive hours.

Most of the draft conventions submitted to the Conference ought, in the view of the governing body of the International Labour Organization, to apply equally to women and to men. The principal importance of the Conference lies in the proposal to place men and women on a footing of almost complete equality in all protective measures contemplated.—G. E. Partridge.

THE NEED FOR SPECIAL HEALTH PROTECTION OF EMPLOYED ADOLESCENTS. *H. H. Mitchell.* Am. Jour. Pub. Health, Nov., 1921, 11, No. 11, 973.—At the present time we have very little knowledge of the physical effects of industry upon adolescents and, although we have reason to believe that this group needs special health protection, very little has been done. Now, however, with the development of the compulsory continuation school, there comes an opportunity to inaugurate a constructive health service for these young people.

"It seems safe to assume from our present knowledge that the age period in which from 20 to 75 per cent. of our children leave school to go to work is characterized by such tremendous changes in physiology and morphology as to make very special demands upon the vitality of the child." The period is a time of crisis even under the best of conditions, and calls for protection from strain and any hazards likely to influence health and normal physical development.

Dr. Teleky of Vienna concludes that the sickness insurance funds give evidence that the morbidity of young workers is extremely high and that the frequency of sickness is greatest, not at the age of 14 soon after entrance into industry, but later. Von Pirquet comments on the marked rise in the

tuberculosis death rate occurring between 15 and 20 years of age as due to gainful occupations, overwork and bad food.

Statistics of the United States Bureau of Labor relating to conditions in Fall River indicate that conditions in the cotton mills are conducive to death from tuberculosis. "The hazard of young female operatives from eclampsia was very marked." The general death rate of "operative females was thirty-three per cent. higher than that of non-operative females."

In the printing trades also there is a higher death rate among the young workers than in the general population of the same ages. Hoffman's figures for England and Wales show a death rate for printers of 3.19 per 1,000 for ages 15 to 19 years, and 2.44 per 1,000 for all occupied males. DeVooys gives the rates for tuberculosis in Holland for the years 1896-1900, for the ages 12 to 17 years, as 118 per 100,000 for printers and 54 for all occupied males at those ages. For the age group 18 to 22 years, the rate was 625 per 100,000 for printers, and 239 for all occupied males.

Hayhurst's statistics for Ohio lead to the inference that in the United States there is a relatively small number of printers under 20 years of age, but these should have better health protection than at present.

The next logical step should be to test the efficiency of the single examination as a method of health protection. The need for re-examinations could be tested by examination of children in the continuation schools; and we could in this way obtain evidence of the relation of various kinds of employment to the health of the young worker.

INDUSTRIAL SANITATION: FACTORY CONSTRUCTION, ILLUMINATION, VENTILATION, HEATING, WATER SUPPLY, SEWAGE DISPOSAL

Report of the Advisory Committee on Atmospheric Pollution for the Year Ending March 31, 1921. H. M. Stationery Office, 1922.—The extent to which atmospheric pollution is dependent upon industrialism is brought out. Thus, the deposit carried down by rain amounted in metric tons per square kilometer in industrial towns, for Rochdale to 24.9, for Birmingham to 21.2, for Newcastle-on-Tyne to 17.4, and for Liverpool to 17.2; while it amounted in more favorably situated localities, for Victoria Park (London) to 7.9, for Southport (Woodvale, Moss) to 5.5, and for Rothampstead to 4.2. These amounts represent deposits washed down by rain; hence they are greater in those months of the year when the rainfall is heaviest. In the summer months at Rochdale with a rainfall of 127 millimeters the deposit was 33 metric tons, and in the winter months with a rainfall of 76 millimeters the deposit was 16.7.

From a health point of view the material deposited is of interest only because it represents what was previously suspended in the atmosphere. Observations on impurity suspended have been made in London and diagrams are given showing how high this rises on foggy days. An attempt is recorded to ascertain the effect of suspended impurity upon health. But up to the present no valuable results have been obtained—probably owing to the shortness of time the records of impurities have been kept.

An interesting reference is made to a method of estimating dust in expired air. Here Dr. J. S. Owens sees reason for holding that ordinary atmospheric dust does, in fact, gain access to alveolar air and that only 30 per cent. of the dust inhaled is removed by the air passages. Further work in this direction will be followed with great interest.—E. L. Collis.

Vacuum Cleaning Applied to Industrial Plants. *C. L. Hubbard.* Factory, March, 1922, 28, No. 3, 285-288.—Vacuum cleaning has recently extended its usefulness to the industries, both in special processes and in general cleaning. This article describes, with diagrams, the fundamental construction of vacuum apparatus and different types of separator adapted to different uses. Estimates are given of the number of sweepers required for various extents of floor space, and the principles, by which the size

of hose and pipe lines is governed, are stated. Suggestions are made in regard to the selection of tools.—G. E. Partridge.

WASHING FACTORY WINDOWS. *T. S. Haviland.* Factory, March, 1922, 28, No. 3, 302. —A great amount of money is spent annually in the washing of factory windows, since usually on large buildings it is necessary to erect staging or other temporary means. The power plant of the Cleveland Water Works has installed a permanent tram rail and car system for washing windows. The rail and fixtures are of simple design and standardized so that any mechanic can lay out, order and install a section or a complete system. There are several advantages, chief among them the entire elimination of the element of danger. With the use of the system 4,600 windows are cleaned by three men in twelve days, at about one-fifth of the ordinary cost.—G. E. Partridge.

INDUSTRIAL WASTES IN RELATION TO WATER SUPPLIES. *W. Donaldson.* Am. Jour. Pub. Health, May, 1922, 12, No. 5, 420-421. —An industrial pollution which places upon water works an unusual burden or difficulty in the way of purification must assume the aspect of a public health problem.

This paper discusses briefly some of the common problems due to industrial wastes. Petroleum wastes, though presumably of no direct hygienic significance to water consumers, impart a flavor or taste sufficient to cause many people to forsake the safe public supply and resort to bottled water of doubtful purity or to local springs and wells potentially or actually dangerous. Producing a similar effect may be mentioned harmless algal infestation, salt wastes from oil well operation, and chlorination odors and tastes produced by chlorine in waters polluted with phenols from waste from gas houses, by-product coke works, or producer gas plants.

Of more importance are the industrial wastes which interfere with proper operation of purification plants, either by impairing efficiency or by imposing an intermittent or irregular load. In this group are mentioned oily, fibrous or pulpy matters. Wastes acting as protective colloids making difficult or uncertain the coagulation with aluminum or iron, include tannery liquors and dye wastes.

Lastly are mentioned soluble inorganic substances, such as lead, zinc and arsenic, which make their presence known only through cumulative effect on public health. —H. F. Smyth.

INDUSTRIAL MEDICAL SERVICE: MEDICAL DISPENSARIES AND HOSPITALS IN INDUSTRIAL PLANTS

BETTER WORK AND MORE WORK PER MAN THROUGH BETTER SIGHT. *E. LeR. Ryer* and *W. B. Fisher.* Indust. Management, Feb., 1922, 63, No. 2, 111-117.—This is an account of a detailed examination of the eyes of 415 employees of the General Optical Company.

Of 830 eyes examined, only 120 were passed as absolutely normal, and more than 200 had defects of such a degree as to call for immediate correction. There were found 127 cases of ocular disease, of which 109 were internal and discernible only by use of the ophthalmoscope.

Of three plans of conducting eye examinations and making corrections, one that comprises thorough examination up to the point of recognizing defects, the employee then to be advised to consult an optical specialist of his own choice, is recommended for industrial concerns not closely connected with the optical industry.

The examination room should be centrally located. The equipment will, of course, vary according to the size of the plant, since when the number to be examined is not large the specialist engaged will be depended upon to bring his own instruments. Preliminary investigation, such as testing for visual acuity and color blindness, taking case histories, etc., should be done by the welfare or personnel department. The specialist should visit each department before examining the workers in order to know the conditions under which the eyes are used.

The value of such examinations as are proposed is great. As a result, the comfort and efficiency of the worker may be increased; production is improved; the quality of the work is changed for the better; data are obtained that may be invaluable in accident cases. Costly processes of selection by trial are avoided.

The suggestion is made that the function of stereopsis should be given more consideration in regard to such employments as those of chauffeur, engineer, motorman, and machinist, in order to detect persons who misjudge distance, and who for that reason are likely to cause accidents.

Information about equipment for industrial examinations and advice as to procedure and record, of interest to the specialist, may be found in the article.—G. E. Partridge.

DEFECTIVE VISION AMONG INDUSTRIAL WORKERS. *Carey P. McCord* and *Donald J. Lyle*. Jour. Am. Med. Assn., Feb. 25, 1922. 78, No. 8, 606-607.—The authors examined sixty-two workers in a textile plant where good eyesight was necessary to obtain the best manufacturing results. Eighty per cent. were women and the average age of the group was 39 years. The chief eye findings were:

"1. Of the sixty-two persons examined, fifteen persons (24 per cent.) possessed vision of 20/20 or better.

"2. The average vision (uncorrected) for the entire plant's personnel (sixty-two) was 20/61.

"3. The average vision of all persons (forty-five) working without glasses was 20/34.

"4. The average vision for persons (seventeen) wearing glasses at work was 20/36.

"5. Eleven persons wearing glasses only for reading purposes at home were engaged at close work with an average vision of 20/55.

"6. Twenty-two per cent. of persons working without glasses exhibited only 1/2 vision or less in one or both eyes.

"7. Thirty-seven per cent. of all workers not wearing glasses would be distinctly benefited through the wearing of suitable glasses.

"8. In those persons (seventeen) already wearing glasses, only four instances were noted wherein the defect was fully corrected. In 33 per cent. of instances, the vision was not at all improved by the glasses that had been supplied to them."

The poor vision in these individuals is a disadvantage to both employee and employer and, coupled with other experiences in industrial medicine, causes the authors to make the following recommendations:

"1. Illuminometer measurements of the light provided for the several types of work in the factory; the provision and maintenance of that quantity of light optimal for the individual job; the elimination of glare.

"2. The suitable testing of visual acuity of applicants for work, and of all employees at yearly intervals.

"3. The referring of all persons exhibiting defects of 20/30 or greater to reliable ophthalmologists for corrections.

"4. Selected job placement for all persons having defects of 20/25 or greater, for whom correction is not feasible or obtainable.

"5. Payments for services of specialist and optician to be made by the factory management, arrangements being made with employee to deduct small weekly repayments from earnings. This procedure insures prompt remedying of the defect, is usually entirely satisfactory to the employee, and avoids services from incompetent sources."
—C. K. Drinker.

MEDICAL SERVICE OF CHICAGO "L" ROADS. *H. E. Fisher*, Hosp. Management, Feb., 1922. 13, No. 2, 56.—The medical department of the Chicago Elevated Railroad serves approximately 7,500 employees. It began with physical examination of applicants for employment, but has extended its activities to include periodical examination of all employees, and the treatment of injuries incurred in the course of duty. A high standard of physical health is set, and all employees (except general office employment and women ticket agents) are examined every two years. The names of those found to have defects are recorded on observation cards and these men are examined at intervals between the regular examinations.

A sanitary inspection is made approximately every four months under the direction of the medical department, in order to determine the condition of all the properties, and a report is made accordingly to the heads of departments.

A first-aid system with about 200 stations is maintained, each station being under the charge of an employee who has received instruction from the medical department. This first-aid instruction is supplemented by health talks through a monthly publication, and there is a first-aid drill team.

Suggestions are made as to what constitutes an effective first-aid service, and the article contains also a list of the contents of the first-aid boxes in use on the Chicago Elevated Roads.

The writer thinks that "with first-aid work properly organized and maintained, the opinion of the medical profession in the past, that the teaching of laymen to do first-aid work was of little value, will be changed and objections overcome." In transportation work first-aid service is indispensable.—G. E. Partridge.

INDUSTRIAL INVESTIGATIONS AND SURVEYS

A Useful Factory Inspection Form. U. S. Pub. Health Ser., Pub. Health Rep., Jan. 6, 1922, 37, No. 1, 10-12.—The inspection form presented is one that was used in some studies in munitions plants during the war. The form is printed on a heavy card 8½ by 11 inches. The front contains an outline for a report of the conditions under which the worker operates: type of building, ventilation, illumination, general conditions, safety hazards, fumes and gases, specific poisons, exposure to heat and cold, fatigue, excessive noise. The back of the card has a printed outline for a rough job analysis in which are to be entered processes, materials, products, degree of skill required, hazards, rest period, method of payment, etc.—G. E. Partridge.

INDUSTRIAL SERVICE AND MUTUAL BENEFIT ASSOCIATIONS

Welfare Work in Bombay Cotton Mills. *N. M. Josshi.* Jour. Indian Indust. and Labour, Feb., 1921.—This article is one of great interest; it tells of the inauguration by the Social Service League some three years ago of welfare work in India, of what is being attempted, and of difficulties encountered. Eight years ago it would have applied in all that it contains to England or America; indeed, it still applies to much of our industrial world. India is only just becoming industrial, and, if welfare work develops as industries develop, she may escape from or solve many difficult problems.

Special difficulties are reported; the insidious money lender or a head-jobber, who is in league with professional money lenders, has to be met by co-operative credit societies; the education of half-time workers (and also adults) has to be undertaken in a country where there is no compulsory education, and where reading rooms and libraries would otherwise be superfluous; crèches are particularly needed for the babies of working mothers. Alcoholism is reported to be increasing with the spread of industrialism, just as it did in England in the eighteenth century, and to call for control. On the other hand, the establishment of dispensaries attended by qualified doctors, of home visitation of the sick, of an eye and dental clinic for half-timers, of outdoor recreation schemes, of public lectures, and of hostel accommodation are reminiscent of our own activities. And so, indeed, are the very phrases used by the author:

"Welfare work is popularly associated with recreation, dining halls, and such other things which, really speaking, form but a fraction of the work which requires to be done for the benefit of workmen in an industry. Recreation and facilities in such other matters will help very little to improve the *morale* of the workpeople if they are ill-paid, ill-fed, and ill-housed . . . Superficially, cheap labour is very costly in the long run, and the aim must be to make workpeople healthier, happier and more intelligent.

and more self-respecting. A really self-respecting workman will always be a safer person to deal with than one who is wanting in this quality. Particularly in welfare work it is necessary to preserve and promote self-respect, for if that work is carried on in a patronizing spirit and is considered as only a sop, it is likely to lose all its value, and labour will rightly resent it." In truth the spirit of welfare and health work is steadily spreading throughout the world.—E. L. Collis.

"We Didn't Have Space for a Lunchroom." *R. Desing.* Factory, March, 1922, 28, No. 3, 300-302.—This article describes a cafeteria arrangement by which each department of a factory has its own canteen. Lack of space for a restaurant led to this experiment in a plant employing 5,500 men and women. Cafeterias were established on nearly every floor of the factory buildings, supplying the noon meal to 87 per cent. of the employees.

As a study in system this report deserves careful consideration by anyone having a similar problem, on account of both the limitation of space and the location of the plant, remote from the homes of the workers. The main inducement in attempting the experiment in this instance was the bad effect upon the workers of eating unsuitable lunches and the consequent loss of time and efficiency in work.—G. E. Partridge.

INDUSTRIAL HEALTH LEGISLATION: COURT DECISIONS: WORKMEN'S COMPENSATION AND INSURANCE

Typhoid Fever Held Compensable under Workmen's Compensation Act. U. S. Pub. Health Ser., Pub. Health Rep., March 10, 1922, 37, No. 10, 538.—"The Appellate Court of Indiana has decided that typhoid fever contracted by an employee through drinking impure water furnished by the employer, is an 'injury' by 'accident arising out of and in the course of the employment,' under the Workmen's Compensation Act, and as such is compensable."—Barnett Cohen.

Employee Insurance. Abstracted from System (British), Dec., 1921, in Factory, March, 1922, 28, No. 3, 326.—This is a brief summary of the status of employee insurance as now established by various acts of the British Parliament. The protection granted to the employer constitutes an indemnity. The onus of proof that an accident has happened devolves upon the claimant. It is unnecessary to prove negligence on the part of the employer, and a workman injured through his own stupidity or carelessness is entitled to compensation, if the accident has arisen "out of and in consequence of the employment." Various specified diseases come under the category of accidents. There is no limit of period during which weekly compensation is payable, but after six months the employer has the right to commute future compensation by the payment of an amount sufficient to purchase an annuity with the post office equivalent to three-fourths of the compensation payable. The employee's right holds good against the legal personal representative of a deceased employer.—G. E. Partridge.

REHABILITATION OF DISABLED EMPLOYEES

Occupational Therapy. *J. W. Brannan.* Am. Jour. Pub. Health, May, 1922, 12, No. 5, 367-376.—This paper is a brief, profusely illustrated account of occupational therapy as recently introduced into the wards of Bellevue Hospital. This work should be under the direction of the medical staff and should receive its enthusiastic support. The needs and capabilities of each individual patient should be carefully studied and the kind and amount of work prescribed by the physician. Complete records should be kept with daily notes of progress. The interest and support of the superintendent are essential

as well as the sympathy and co-operation of nurses and social service workers. The success of occupational therapy is largely dependent upon the tact and good judgment and thorough training of the teachers. It is suggested that the medical colleges be asked to add to their courses in therapeutics "The Science of Healing by Occupation."

Among the good results of occupational therapy are the following: Patients who have been given some form of interesting occupation are happier and recover more rapidly, and are in a better condition to resume work; the period of hospitalization is lessened by as much as one-third in many cases; a large number of psychopathic patients recover who formerly would have been committed to hospitals for the insane; occupational education has been of great therapeutic value to neurological ward patients and has vastly improved their morale and, therefore, their health; surgical patients have function restored to stiffened joints and flabby muscles; the entire aspect of wards is greatly changed for the better.—H. F. Smyth.

SAFETY. Abstracted as follows from Iron Age, April 13, 1922, in Factory, June, 1922, 28, No. 6, 688.—"As a direct result of the world-wide experiments in rehabilitation of men injured in war, America has now a hospital dedicated solely to the care of industrial diseases and accidents and the restoration of industrial casualties to active useful life again. It is the Reconstruction Hospital, at 100th Street and Central Park West, New York. It now enters upon a national career, prepared to offer a unique service to all industry in general.

"It is a new idea to have a hospital where men suffering from any of the many casualties of industry may receive the benefits of an intensive study of their cases by surgeons specializing in all the after-care of the patient until he is fit to earn a livelihood.

"Yet, in the brief life of the present hospital, men have been sent from all over the country to take advantage of its unusual treatment, and many suffering from seemingly incurable physical ailments and distortions have been returned to their place in useful industrial life again."—M. C. Shorley.

FROM THE ACCIDENT BACK TO THE JOB. *Hilda B. Goodman.* Hosp. Management, April, 1922, 13, No. 4, 57.—Because, during the war, the medical profession and the public saw the ill effects of having wounded soldiers lying in hospitals and at home without definite work to occupy their spare hours, sums of money have been spent on occupational therapy in military hospitals. The need is as great in industrial medicine, but in this field the work is largely for the future. The long convalescence of the injured man favors the development of indolence of mind, with the result that many cripples are not ambitious for work, even when work has been made possible by surgical skill. Both in the hospital and after going home, the injured man is not being subjected to the proper influences and is not likely to be suitably occupied.

The curative workshop becomes a need. On the plan of occupational therapy, interest is aroused as soon as possible. A man goes to the workshop when able, and his affiliations with the shop are maintained after going home. At the workshop he receives massage, he exercises and measures his progress there on apparatus, he engages in some occupation, and he receives a commission for the sale of the articles which he has made. Means of recreation, such as books and games, are provided.

An ideal curative workshop for industrial workers should be near manufacturing districts and be provided with plenty of room and air. It should open and close with the factories. It should have a convalescent ward, with a doctor and nurse in attendance.—G. E. Partridge.

ABSTRACT OF THE LITERATURE

OF

INDUSTRIAL HYGIENE

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GENERAL

FACTORY INSPECTION IN SOUTH AUSTRALIA IN 1920. Abstracted from Report of Chief Inspect. Factories for Year Ended Dec. 31, 1920, in Internat. Labour Rev., March, 1922, 5, No. 3, 514.—The factory inspection office of the South Australian government administers the Factories Acts, the Early Closing Acts, the Apprentices' Technical Education Act, the Lifts Regulation Act, the Employees' Registry Offices Act and several others.

The forty-eight-hour week was generally in force in 1920, but there was a tendency to change it for a forty-four-hour week. Overtime work was less frequent than in the preceding year. Wages increased during the year in all the occupations regulated by wages boards.

The accident record for the year is reported, and there is noticed marked antipathy on the part of the workers to the use of guards for machinery. Under the Industrial Code, occupiers of factories will henceforth be responsible for seeing that guards are furnished and kept in place.—G. E. Partridge.

FACTORY INSPECTION IN NORWAY IN 1920. Abstracted from official report, in Internat. Labour Rev., March, 1922, 5, No. 3, 509-511.—The administration of the labor inspection laws in Norway is in the control of two bodies: the inspection department, and an advisory labor council—both parts of the Department of Social Affairs. The Labor Council deals with such matters as applications for exemption from the eight-hour regulations, and for reduction of hours in special cases.

Special regulations were issued during the year in regard to hygiene and sanitation in

cellulose, explosive, match and electrochemical factories, lithographic establishments, and metal grinding. Accidents reported during the year amounted to 2.7 per cent. of all persons employed.

The report of the chief woman inspector contains several illustrations of departments of model factories and examples of effective guards and working clothes. Statistics are given in regard to the activities of the inspection department, etc.—G. E. Partridge.

Rise of Factory Labor in India. *R. K. Das.* U. S. Bur. Labor Statis., Month. Labor Rev., March, 1922, 14, No. 3, 7-27.—The rise of modern industrialism in India has centered about the development of two great industries, the manufacture of cotton and of jute. Three classes—the cultivators of land, the village servants, and the artisans or craftsmen—have been drawn upon as industrial workers. Figures for 1917-1918 (as given in "Statistics of British India") show a total industrial operative force of 1,238,238, about half of which is employed in the textile industries (this number including those engaged in the transport industries). Bombay is the center of the cotton industry, and Bengal of the jute industry.

At the beginning of the Indian factory system, the time of work extended from sunrise to sunset. In 1911 the hours of work of adult males were limited to twelve in one day, and in February, 1921, a resolution was passed in the Indian legislature ratifying the draft convention of the International Labor Conference held at Washington, D. C., in 1919, which reduced the working hours in Indian factories to sixty hours a week for both men and women.

The factory act of 1911 made special provisions regulating the hours of child workers. Children were required to produce certificates of age and physical fitness before they could be employed, and could be admitted to full-time employment only at 15 years of age. Their working hours were fixed at seven, with one-half hour of rest for every six hours of continuous work, but for textile factories the hours were limited to six in any one day, with no provision for a rest period.

The common time measure for computing wages in the factories was the month. The average monthly wages paid in a Bombay cotton mill in January, 1919, varied according to the occupation from 8 rupees to 75 rupees, jobbers in the weaving department earning the highest wages—from 45 to 75 rupees (the rupee at par is 48.66 cents). Tables show the movement of wages in a variety of industries from about 1890 to 1920; in rare cases the wages have been trebled, but an increase of from 50 to 100 per cent. is commonly shown. The cotton mills, however, have a somewhat lower rate of increase.—G. E. Partridge.

Basic Experiments in Vocational Guidance. *C. S. Yoakum.* Jour. Personnel Research, May, 1922, 1, No. 1, 18-34.—This is a comprehensive study of the fundamental ideas of vocational guidance. It is shown that the general problems are to determine the nature and content of a position; to develop and improve present methods of job analysis; to define the degree of responsibility involved; to set forth opportunities for promotion with the search for collateral opportunities; and to state the knowledge required for the work. An important question is that of adjusting the wage according to the degree of responsibility of a position.

The study of human differences is another problem basic to vocational guidance. Variations in mental traits are wide, and one of the greatest differences is measured by the intelligence or mental alertness test. The army tests of 94,000 men indicate that there are several occupational levels corresponding to degrees of intelligence. This gives valuable information to be used in advising individuals. The intelligence test is shown to be an excellent measure of efficiency and success in clerical occupations, but excellence in mechanical work may not, as tests show, be at all correlated with intelligence ratings. A combination of two tests (not mental alertness tests) enables one to pick successful stenographers with almost 100 per cent. accuracy.

Mental tests applied to the whole personnel of one company showed a higher range of ability among executives than among clerks, indicating that even after years of experience the clerks could not compete with higher officials. Thurstone's tests have indicated significant differences in mental characteristics in groups of students electing different

studies leading toward different occupations. Other tests have been worked out by studying the differences of these students, and by analyzing and measuring ability in specific occupations, such as that of salesman.

An effort has been made to measure people's interests, their ability to meet other people, their temperamental differences, their aggressiveness, etc.

A third fundamental problem in vocational guidance is the determination of the genetically continuous and discontinuous traits of an individual.—G. E. Partridge.

Vocational Education in the Pulp and Paper Industry. *J. C. Wright.* Reprinted from Paper Trade Jour., 1921, pp. 5-71.—The writer has made a detailed study of the pulp and paper industry with reference to its educational problems. He finds an industry in which a large number of the workers are of relatively low skill, and a situation calling, in his opinion, for definite vocational training.

In organizing a complete training program in any industry consideration must be given to the duties and responsibilities of each different group of workmen. The aim is, therefore, to analyze the operations of the industry, and to correlate types of work with vocational training of the right kind. There is presented a useful analysis of the jobs in news print mills, groundwood mills, sulphite mills, and book and rag mills. The paper ends with a brief outline of a course of instruction in the pulp and paper industry, including general matters of elementary education and scientific knowledge involved.—G. E. Partridge.

SYSTEMIC OCCUPATIONAL DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

A Glass Blower's Pipe in Which Blowing with the Mouth Is Eliminated. *William Lippold.* Zentralbl. f. Gewerbehyg., March, 1922, 10, No. 3, 81-84.—A producer of glass for many years describes how he started to devise apparatus to replace glass blowing by mouth. The successful apparatus is now patented and in use. A diagram is given. The pipe contains a store of compressed air which is released by a valve controlled by either the operator's chin or finger, allowing the manipulations to be very similar to that of the old-fashioned pipe This pipe facilitates the blowing of window glass, plate glass, and all sorts of bottle ware. It eliminates the dangers to glass blowers of damaged teeth, diseased lungs, enlarged heart, and catarrhal troubles in the respiratory tract.—E. L. Sevringhaus.

CENTRAL NERVOUS SYSTEM

Saturnine Neuritis. *Ettore Tedeschi.* Abstracted as follows from Riforma med., 1922, No. 3, in Il Lavoro, Feb. 28, 1922, 13, No. 2, 55-56.—This report deals with four lead workers—three of them in the printing trades, the fourth a painter—all suffering from ischialgia, confined chiefly to one side. Lead is considered to be the cause in all four cases, and the author regards the condition as a neuritis affecting especially the second sacral nerve. Aside from the pain, the symptoms consisted in loss of tactile and heat sensation along the side of the leg and the outer margin of the foot of the affected side, showing involvement of the tibial nerve. Tedeschi believes that plumbic neuritis is more often localized in the lower limbs than is usually believed. The peroneal nerve may be involved and sometimes the internal popliteal. As a usual thing this neuritis is bilateral but, as in the cases reported, it may be confined to one side.—Alice Hamilton.

Occupational Dyskinesia — Paresthetic Type. *C. Houllion.* Abstracted as follows from Rev. neurol., April, 1921, 28, p. 348, in Arch. Neurol. and Psychiat., May, 1922, 7, No. 5, 656.—"The author comments on the perplexing problem presented by the occupational spasms, so-called, directing attention to the importance, in this field, of Duchenne's work, according to which such disorders are classified as motor and sensory, including under the former the akinetic, hyperkinetic (classical cramp) and ataxic (tremors, choreiform and ataxic movements) types. The

purely sensory type, of which Houllion's case is an example, is deemed extremely rare, but, on the other hand, sensory disorders of some kind, such as anesthesia, paresthesia and 'neuralgia', are frequently encountered as complicating features in the more essentially motor types.

"Houllion's case was that of a seamstress, 56 years of age, with a negative family and personal history, except that both the patient and her mother were described as of a 'nervous' temperament. The present trouble dated back three years and manifested itself primarily as a severe tingling and numbness in the fingers and hand (right), occurring characteristically in the morning, particularly after the patient had sewed for a long time or had done extensive laundering the preceding day. This trouble was usually first noted about fifteen minutes after she commenced to sew in the morning, and beginning in the finger tips, gradually extended so as to include the entire hand, with short periods of intermission, continuing until it was no longer possible to hold the needle. At such times the hand appeared ischemic with an accompanying sensation of frigidity but with no associated spasm or rigidity. On dropping the needle and holding the hand pendent or immersing it in hot or cold water, the paresthesia soon disappeared, only to recur, however, on the resumption of sewing. This situation would repeat itself from six to eight times, following which the patient was able to sew for the balance of the day without further discomfort. Curiously, no disturbance was found to occur if the patient preceded her morning sewing by a period of other work, and no difficulty was ever reported at night. The course of the disorder had apparently not been progressive and had been marked by phases of complete remission over periods — one of them several months in duration — when needlework had been discontinued.

"Neurologic examination was negative except for slightly increased sensitivity of the right arm trunks to electrical stimulation.

"Mention is made categorically of the various hypotheses which have been advanced as to etiology, the author seeming to favor that of perverted vasomotor habit or 'neurosis' dependent, presumably, on basic autonomic imbalance or dysfunction."—M. C. Shorley.

NEUROMUSCULAR SYSTEM

Two Cases of Paralysis of the Serratus Magnus. *Giovanni Allevi.* Il Lavoro, April 30, 1922, 13, No. 4, 105-109.—Paralysis of the serratus magnus, partial or complete, may be caused by trauma, or may follow certain infectious diseases, especially typhoid fever, or may be involved in an atrophic paralysis, such as poliomyelitis. Certain occupations also may be attended with paralysis of this muscle, such as the work of porters, blacksmiths, masons, rope makers, and soldiers, which involves pressure or stretching or wounding of the long thoracic nerve. Therefore prolonged pressure of heavy weights on the shoulders, the frequent lifting of heavy weights, blows on the shoulder, wounds, etc., may be followed by such a paralysis. The course of the disease is relatively slow.

It is a rare affection. Among about 15,000 cases of accident which have come to the medico-legal department of the Humanitarian Society of Milan, the following two are the only cases of paralysis of the serratus magnus. One was a vintner, 18 years old, whose work required him to carry heavy weights on his shoulders every day. The second, also a young man of 18 years, was a mason's apprentice who also had to carry heavy weights on his shoulders. Both had a bilateral paralysis which was shown, when the patient was at rest, by the action of the opposing muscles, the rhomboids, elevators of the scapula, etc., which, in paralysis of the serratus, separate the scapula from the thoracic wall and draw its inferior angle toward the vertebral column.

In normal subjects, raising of the arm above the head is effected by the deltoid, the serratus magnus, and the trapezius, but when the serratus is paralyzed the arm cannot be raised beyond a plane horizontal with the shoulder. If, in paralysis of the serratus magnus, the arm is lifted forward, the scapula, rotating on its internal angle, separates from the thoracic wall so that a depression appears between the two and the scapula assumes a wing-like appearance. Both patients showed these signs clearly.—Alice Hamilton.

RESPIRATORY SYSTEM

On So-Called Saturnine Asthma. *Tedeschi.* Abstracted as follows from Riforma med., 1921, No. 48, in Il Lavoro, Feb. 28, 1922, 13, No. 2, 53-55.—Two men presenting all the signs of chronic lead poisoning suffered from attacks of bronchial asthma, which in its course differed distinctly from uremic asthma and from that which accompanies uncompensated cardiorenal disease. The author attributes the asthma etiologically to the occupational poison which was undoubtedly present. The first case was in a type-founder who had suffered attacks of bronchial asthma for six years. In the intervals between attacks he had no positive signs in the chest except harsh respiratory sounds, but during and after an attack the usual findings in bronchial asthma, with Curschmann spirals and eosinophils in the sputum were present. These attacks were always more frequent when the man went back to work after a period of rest. When he changed his trade they diminished in frequency for about twenty months, and then disappeared. The history of the second case, a ship painter who had had attacks of typical asthma for eight years, was much the same, and he, too, was relieved by change of work. —Alice Hamilton.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

Industrial Mercurial Poisoning. *Luigi Devoto.* Il Lavoro, Jan. 31, 1922, 13, No. 1, 18-20.—The majority of authors hold that industrial mercurialism appears as a chronic process, never as an acute process. A subacute form is sometimes reported, but no definite clinical picture of subacute mercurialism has been described. Teleky says that subacute industrial mercurialism represents a mild or abortive form in which stomatitis is never absent and it may be the only symptom. Others mean by this term a form of mercurialism with unusually rapid development, while Letulle uses subacute mercurialism only for that form of poisoning which is caused by the use of mercurial remedies.

Devoto describes three cases of industrial mercurialism which he saw recently in employees of a storage battery factory. These patients had the classical triad of mercurialism, stomatitis, tremor, and presence of mercury in the urine, but Devoto considers them instances of subacute poisoning because of the rapid development of the intoxication and the rapid elimination of the poison. The mercury was absorbed in vapor form, which may explain the peculiar course of the intoxication. The rapid development of stomatitis, tremor, and erethism made it impossible for the men to continue at work, and protected them from further exposures to the poison. The symptoms had disappeared after a few weeks and with equal rapidity mercury disappeared from the urine. The recovery of these men was greatly assisted by absolute rest in bed, a treatment which Devoto highly recommends.—Alice Hamilton.

The Effort to Rehabilitate White Lead. *L. Ferrannini.* Il Lavoro, Jan. 31, 1922, 13, No. 1, 24.—In a paper given before the Twenty-Seventh Congress of Internal Medicine at Naples, October 25, 1921, Ferrannini criticizes the efforts now being made in Germany and in England to minimize the dangers of white lead and to attribute the intoxication of painters to turpentine. He believes that this effort is not prompted by disinterested motives and that it has no scientific basis. Clinical and pharmacological evidence shows a great difference between the effects of lead and of turpentine, and the greater industrial morbidity of painters as compared with makers of white lead is due not to the harmfulness of turpentine but to the fact that hygienic measures can be applied in white lead factories which can be carried out only with great difficulty in painting.—Alice Hamilton.

The Opinion of the Governments of the Australian States on the Use of White Lead in Painting. Internat. Labour Rev., May, 1922, 5, No. 5, 819-829.—An inquiry on the use of white lead in painting was conducted by the Board of Trade of New South Wales and answers were submitted to the International Labour Office by the other Australian states.

It was found that while the average age at death of all occupied breadwinners was 57.8, that of painters was 53.5. During the period 1909-1915 the index of mortality for painters was found to be 12.9, while that for all occupations was 12.0. Excess of death among painters from certain diseases—Bright's disease, tuberculosis, lead poisoning—was reported, and insanity from lead poisoning was said to be more frequent among painters. "The Board is of the opinion that the evidence from administrative and trade experience is conflicting and unsatisfactory, but tends, nevertheless, to support the conclusions drawn from statistics."

Memoranda were submitted by the Commonwealth of Australia and by Western Australia, South Australia, Queensland and Tasmania. A total of 123 deaths from lead poisoning occurred in the commonwealth during the period from 1908 to 1918. The report from Western Australia emphasized several points, such as the importance of other substances than white lead in causing sickness among painters, the avenues through which poisoning takes place, and the sanitary means of prevention of poisoning. Communications from the other states were brief and unimportant.—G. E. Partridge.

THE ELECTRIC CLYSTER FOR THE TREATMENT OF LEAD COLIC. *Andrea Vinaj.* Il Lavoro, April 30, 1922, 13, No. 4, 109-113.—In the clinic for occupational diseases in Milan, Vinaj, an assistant of Preti, treated a series of cases of lead colic by the method recommended by various French authors (Labadie, Lagrave, Boudet, etc.) for intestinal obstruction, namely, by introducing into the lower bowel an injection of warm water through a sound which is at the same time the positive pole of an electric battery. The negative pole, covered with moist absorbent cotton, is placed on the abdomen. In order to guard against the possibility of forming an eschar in the intestine, about a liter and a half of water is introduced before the galvanic current is turned on. According to the toleration of the patient the current is increased, but never beyond 50 millimilliamperes, and the current is sometimes interrupted, again reversed.

Vinaj gives the history of eight cases in all of which pain was relieved during and after the treatment and constipation usually overcome with great promptness.—Alice Hamilton.

THE TECHNIC OF EXAMINING BLOOD FROM LEAD WORKERS. *H. Engel.* München. med. Wchnschr., April 28, 1922, 69, No. 17, 626-627.—Comparison of the usual fixed and stained thin smear of blood with the unfixed thick drop method which has been used widely in the last few years shows that the newer method finds basophilic degeneration in normal blood, at times, and more of the stippled cells in cases of lead poisoning than does the older and standard method. This stippling is not the same as the recognized marking of basophilic degeneration, and is probably an artefact due to the stain. The method is therefore not reliable unless used with great caution. Further research is being carried on.—E. L. Sevringhaus.

THE POISONOUS PROPERTIES OF COLLOIDAL SILICA. *W. E. Gye* and *W. J. Purdy.* Brit. Jour. Exper. Pathol., April, 1922, 3, No. 2, 75-94.—*Effects of the Parenteral Administration of Large Doses.*—Silica sol administered parenterally is a poisonous substance. Injected intravenously in very large doses it causes immediate death, as a result of clotting of the blood. Injected in sublethal doses it accelerates the rate of clotting of the blood when shed. Added to blood in vitro it has no influence on the rate of clotting. Silica sol injected intravenously in rabbits in daily doses of 30 to 72 mg. causes death in from two to four days, and postmortem petechial hemorrhages and profound degeneration of the liver and kidney are found. The conclusion is drawn that the primary action is on the vascular endothelium.

Effects of Repeated Intravenous Injections on Rabbits: Fibrosis of the Liver.—The intravenous injection of 5 mg. or more of silica sol daily in rabbits is followed by fibrosis of the liver, enlargement of the spleen, and changes in the kidney resembling interstitial nephritis.

The weekly injection of 5 mg. of silica sol has but little effect on the liver and kidney, but in both organs the changes found, though small, are quite definite. Only one animal

was used in this experiment, and the conclusions drawn are, therefore, provisional. It would appear from this single result that, in order to cause an abundant formation of connective tissue with this dose, the injection of silica must be repeated daily. If seven days are allowed to elapse between the administration of the doses the lesions produced by each dose heal quite completely before the next dose is given. When the weekly dose is 30 mg., a very definite fibrosis of the liver and degeneration of the kidney are produced in a few months. (The single result reported in this paper has been confirmed in other experiments which will be published later.) From this it may be concluded that the damage to cells caused by 30 mg. of silica sol is too extensive to be healed completely in one week, and that a chronic pathological condition is induced, fibrous tissue being formed in the constant attempt at repair.

Each article contains excellent illustrations showing the pathological changes produced in the liver and kidney. The authors do not refer to the significance of their work to the problems of pulmonary silicosis. Nevertheless, those interested in the pneumokonioses are bound to draw the conclusion that the well-known fibrosis of the lungs which follows prolonged inhalation of silica dust must be a reaction similar to that now obtained experimentally.—E. L. Collis.

Dangers to Health in Vulcanizing Works. *O. Calamita.* Abstracted as follows in Internat. Labour Rev., April, 1922, 5, No. 4, 654-655.—"A clinical study of workers employed in vulcanizing rubber goods has recently been published by Dr. Calamita, a member of the medical inspection staff of the Rome Labor Office. His investigations covered seven workshops and twenty workers, and the various methods of vulcanizing were all examined. An elaborate clinical examination of the employees was followed by detailed blood tests and inspection of the sanitary conditions of the workrooms.

"Dr. Calamita states that one-third of the workers suffered from chronic poisoning. He considers that this is caused by benzol mixed with other substances (helped by the bad ventilation), rather than by carbon disulphide of which very little is used, or benzine, which is freely used, but is not very poisonous. Persons predisposed to the poison are affected sooner than others. The most usual symptoms are debility, oligaemia, diminution of the haemoglobin, morphological changes in the red corpuscles, reduced resistance of the red corpuscles, eosinophilia (which may be severe), and irritation of the respiratory system.

"Among the precautions recommended are either better ventilation of workrooms by localized exhaust pipes, or prohibition of work in premises with insufficient floor and window space; strict exclusion of children under 15; improved vulcanizing solutions, a mixture of benzine and benzol being recommended in which the proportion of the latter has been reduced to the lowest limit technically possible; avoidance of the use of the highly poisonous carbon disulphide; frequent medical inspection of the workers, and examination for eosinophilia, when necessary; temporary exclusion from work of the workers most affected, and instruction of the workers in the poisonous properties of the substances used and the precautions which should be adopted."—G. E. Partridge.

The Health of Munition Workers in a Shell-Filling Factory. *J. Anderson* and *E. D. Anderson.* Abstracted as follows from Glasgow Med. Jour., 1922, 97, 1-16, by F. S. Hammett, in Chem. Abstr., May 20, 1922, 16, No. 10, 1619.—"Report of 18 cases of toxic jaundice apparently due to the occupational hazard in handling or exposure to trinitrotoluene or its compounds."

DUST HAZARDS AND THEIR EFFECTS

Removing the Dust from the Casting Cleaning Room. *C. C. Hermann.* Indust. Management, March, 1922, 63, No. 3, 171-174.—The author presents engineering data on cleaning shops, exhaust systems for reducing emery dusts, and describes the use of sand blasts, etc., with cyclone or centrifugal collectors.—P. Drinker.

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

Dental Caries of Gingerbread Bakers and Candy Makers in Nuremberg. *Anne Singer.* Zentralbl. f. Gewerbehyg., March, 1922, 10, No. 3, 65-80.—The author discusses the damage to teeth in the industries using lead, mercury, phosphorus, arsenic, copper, acid gases, coal tar derivatives, trichlorethylene, carbon bisulphide, and in the glass blowing and mother of pearl industries. Actinomycosis is mentioned. The effects of grain, flour and sugar dust are the subject of statistical study.

The gingerbread industry is very large in Nuremberg. Caries of the teeth is found to be extraordinarily prevalent among the bakers of gingerbread and among confectioners, etc., who have to work in the dust of flour and sugar. A coating of these materials on the teeth makes a good medium for acid-producing bacteria. The author urges personal prophylaxis by scrubbing the teeth at least twice a day, and by semi-annual tooth inspection. The problem of educating the workers is touched upon. About one-seventh of the working population of Nuremberg is engaged in these varied occupations with high tooth hazards.—E. L. Sevringhaus.

Results of an Inquiry by the Austrian Society for Cancer Research and Prevention. *S. Peller.* Wien. klin. Wchnschr., Feb. 9, 1922, 35, No. 6, 121–127; Feb. 16, 1922, No. 7, 153–158; Feb. 23, 1922, No. 8, 183–185.—Most responses to the cancer questionnaire denied any relation between occupation and cancer mortality. Others noted innkeepers, physicians, chimney-sweeps, peasants, and merchants as most susceptible.—B. Cohen.

Phthisis in the Book-Printing Industry. *Paul Gerber.* Wien. klin. Wchnschr., Feb. 16, 1922, 35, No. 7, 158-159.—Consumption among book printers and allied workers runs on the average for five years in a chronic or sub-chronic form. Lead poisoning appears not to influence the disease in any way.—B. Cohen.

Oil of Chenopodium in Ankylostomiasis. *Filippini.* Abstracted as follows from the Policlinico, 1921, No. 38, in Il Lavoro, Feb. 28, 1922, 13, No. 2, 57.—Filippini objects to the use of oil of chenopodium, especially in treatment of hookworm disease on a large scale. It is easy to set up lesions in the kidneys, disturbances in the internal ear, and even blindness, and it is therefore contraindicated in patients suffering from eye or ear disease. It is also contraindicated in anemia, and since the latter is invariably present in ankylostomiasis, this fact alone is enough to cause its rejection. There is no reason to prefer it to thymol.—Alice Hamilton.

Studies on the Chemotherapy of Silver and Arsenic Compounds in Experimental Tuberculosis. *M. I. Smith.* Am. Rev. Tubere., May, 1922, 6, No. 3, 183-191.—The author summarizes as follows:

"An investigation was conducted on the chemotherapy of some arsenic and silver compounds in tuberculosis. The results permit of drawing the following conclusions:

"1. Neoarsphenamine and silver arsphenamine have a very slight inhibiting action on the growth of the tubercle bacillus *in vitro.* Colloidal silver oxide has no effect whatever on its growth, while silver methylene blue has a very considerable inhibiting action on its growth.

"2. None of these substances has any demonstrable effect on the pathogenicity of the tubercle bacillus when exposed to their action *in vitro* at body temperature for forty-eight hours.

"3. None of these substances when administered to experimentally infected tuberculous guinea-pigs has any favorable influence on the course of the disease."—M. C. Shorley.

OCCURRENCE AND PREVENTION OF INDUSTRIAL ACCIDENTS

Hazards of Dry Cleaning Establishments. *T. P. Endicott.* Nat. Safety News, June, 1922, 5, No. 6, 33-34.—The term "dry cleaning establishments" applies to those establishments that totally immerse garments in a solvent other than water—a process mak-

ing fire or explosion probable at any time without warning.

The author enumerates the several hazards involved in these houses, and suggests diminishing the dangers by correcting the location, lighting, use of solvents, ventilation, drying, and electricity of the establishments.—M. C. Hamblet.

THE ECONOMIC RELATION OF ACCIDENTS AND PREVENTABLE DISEASES TO THE COAL-MINING INDUSTRY. *A. L. Murray.* U. S. Bur. Mines, Reports of Investigations, April, 1922, pp. 5. —The study is based upon the experience of coal mining camps in the state of Utah. It is shown that the number of accidents tends to increase year by year. When compared with production and the number of men employed, the fatality rate and the permanent disability rate for the four years (1917–1921) show a marked increase.

By analysis of data regarding days of loss, average wage, average tonnage per man per day, etc., the writer estimates a total loss from these accidents amounting to an average well above three-quarters of a million dollars per year or approximately 17 cents for every ton of coal mined.

A similar study is made of the losses resulting from two diseases—smallpox and typhoid fever. At first sight the loss from these diseases may seem to be inconsiderable, since they are infrequent; but when it is considered that they are preventable, and when the conditions that arise when an outbreak of these diseases occurs in a mining camp are taken into account, the loss cannot be regarded as insignificant. In the case of smallpox and typhoid fever, the means of prevention are so simple and so readily applied that the loss from these diseases may be considered inexcusable.

The monetary losses due to accidents and contagious diseases in the coal mining industry in Utah, as shown, average close to a million dollars per year.—G. E. Partridge.

REDUCING ACCIDENTS BY INCREASING NUMBER OF ACCIDENT REPORTS. *H. T. Aldrich.* Safety Engin., April, 1922, 43, No. 4, 140.—The unusual feature in this safety contest, which continues for one year, is that, instead of prizes being awarded to the department which has the lowest number of accidents for the year, they are given to the department that reports the largest number of accidents. This feature is preventing the development of complications arising from minor injuries. —R. M. Thomson.

OBTAINING AND PRESENTING SAFETY STATISTICS TO THE BUSY EXECUTIVE. *A. M. Underhill.* Safety Engin., April, 1922, 43, No. 4, 131; May, 1922, No. 5, 199.—This paper, which appears in two issues of *Safety Engineering*, correlates and presents facts and figures in safety work. After data have been collected and careful attention has been given to what they represent, the facts should be so presented that they are readily discerned by persons unfamiliar with the work.

Part II of this article shows by actual charts how to analyze accident statistics by graphic charts, and gives the most convenient forms of co-ordinate paper for use in plotting curves.—R. M. Thomson.

MORE ABOUT "SAVING FINGERS." *H. F. Webb.* Nat. Safety News, June, 1922, 5, No. 6, 26.—Through the efforts of the superintendent of the press department, The Watson Company, of Attleboro, Mass., has reduced accidents to a minimum. This has been done through safety education and co-operation of the employees. Several safety devices which have been installed in this plant are described.—M. C. Hamblet.

HOW ONE SMALL PLANT SOLVED THE SAFETY PROBLEM. *W. E. Magraw.* Nat. Safety News, June, 1922, 5, No. 6, 13.—The H. H. Robertson Company, Pittsburgh and Ambridge, Pa., is the winner of the Rice Safety Award for a 100 per cent. record in accident prevention during 1921. This company, employing 124 men, worked 250,000 hours last year without a lost-time accident. Although a workmen's committee and a general committee were formed, they were both discontinued and the idea of safety was directly inculcated in the minds of the workers by the foremen, who were responsible for the safety as well as for the production of their departments.—M. C. Hamblet.

HOW MOVING PICTURES HELP IN SAVING LIVES AND PREVENTING INDUSTRIAL INJURY.

Safety Engin., April, 1922, 43, No. 4, 138.—This is a general review of the part played by motion pictures in accident prevention, and contains an appreciation of the film as a means of increasing industrial safety.—R. M. Thomson.

INDUSTRIAL SURGERY

TYPES OF INJURIES MET BY THE RAILROAD SURGEON. *J. H. Blackburn.* Southern Med. Jour., Feb., 1922, 15, No. 2, 143–146.—Recent reports of the Interstate Commerce Commission show that 85 per cent. of the persons, other than passengers and employees, involved in railway accidents, are trespassers.

Several characteristics of railroad injuries deserve notice. The most striking in the writer's experience are the multiple nature of the injuries, the large number of lacerated wounds, and the comparatively marked degree of both primary and secondary shock.

Various types of injury are specified, and there are brief case histories of seven cases intended to illustrate the unusual or extraordinary features of cases in railway surgery.—G. E. Partridge.

INDUSTRIAL PHYSIOLOGY: NUTRITION, METABOLISM, FATIGUE, ETC.

THE POISON OF FATIGUE IN EXPERIMENTAL TUBERCULOSIS AND IN CONSUMPTIVES. Abstracted as follows from Annali Med. Nav. e Colon., 1920, 2, 615 and 767, in Tubercle, May, 1922.—By way of preface to his own voluminous treatise, the author describes the researches of various biologists on the subject of kenotoxin—the toxin associated with fatigue. Particularly he is impressed with the work of Weichardt, whose theory was supported by Wolff-Eisner in 1905 and by Ferrannini and Fichera in 1912. He then proceeds to a description of his own experiments carried out in order to determine whether experimental tuberculosis is affected by the toxin of fatigue, and, if so, what is the mechanism of this influence. The kenotoxin was manufactured according to Weichardt's technic with only a slight modification. Rabbits were used for preparing the toxin, rabbits and guinea-pigs for the antikenotoxin. The author then proceeds to give full evidence for his conclusion that the kenotoxin so prepared will cause typical anaphylactic shock in the guinea-pig.

The influence of fatigue on tuberculosis morbidity was shown by infecting a group of guinea-pigs fatigued for a fortnight and a control group of equal weight which had been resting: the fatigued showed less resistance. With small doses of kenotoxin a similar result was obtained, but on increasing the dosage in a second series of experiments the intoxicated animals were found to succumb much more rapidly to infection with tuberculosis than did the controls.

The effect both of fatigue and of kenotoxin brought to bear after experimental infection with tuberculosis showed that both, and especially the latter, hastened the course of the disease and aggravated the symptoms.

The next step in the experiments was to determine whether antikenotoxin would neutralize the kenotoxin *in vivo*, the guinea-pigs being grouped according to whether they had had (*a*) kenotoxin only, (*b*) kenotoxin and antikenotoxin, or (*c*) neither kenotoxin nor antikenotoxin. Groups (*b*) and (*c*) survived with equal success, while in group (*a*) the disease was markedly aggravated. In other words, the ginea-pig treated with both kenotoxin and antikenotoxin behaved as a resting guinea-pig would, while the guinea-pig treated with kenotoxin only behaved like a fatigued guinea-pig.

A series of investigations into the effect of fatigue on immunity resulted in the following conclusions: (1) that fatigue diminishes the resistance of the animal to the action of the tuberculosis toxin (aqueous tuberculin of Maragliano); (2) that animals passively immunized and at the same time subjected to fatigue behave as those in the previous group when treated with tuberculin (fall of temperature, prostration, rapid loss of weight, and death), controls being able successfully to

withstand a lethal dose of tuberculin; (3) that bacteriolysis is delayed and diminished as a result of fatigue; (4) that fatigue results in a fall of the opsonic index and a diminution of the amount of antibodies present in the blood.

After these preliminary studies the writer broaches the more difficult question of the effect of fatigue in the human being. Without making any exploration into the tempting fields of etiology, Captain Pietroforte confines himself to the effects of fatigue on the course of a declared disease, keeping an eye on the application which must be made of his research to the exercise treatment of tuberculosis. The method selected for fatiguing the patients was to make them walk until they just began to feel tired. The healthy controls were subjected to a more marked degree of fatigue. Altogether fifteen patients were examined under these conditions, the results being classified according to the influence of fatigue on the temperature, pulse, respiration, blood pressure, metabolism, and weight. Obviously these results cannot be stated with the same clearness as is possible in a laboratory. The full observations of each of these fifteen cases are given in the paper. The main conclusions reached are that in tuberculous, as distinct from healthy individuals, fatigue is usually followed by azotemia, very slight azoturia, and diminution in weight. Temperature, pulse, and respiration show no notable changes, while the blood pressure is only seriously affected in the more advanced cases. Practically, he concludes that although fatigue is usually harmful to the tuberculous in whom the normal reactions of the healthy are absent, there may be found the chosen moment when it is actually useful. To this end careful account must be taken of the weight and of the nitrogen metabolism. The theory is that the toxin affects the metabolism through the central nervous system, and if given in sufficiently small and well-spaced doses its exciting action prevails rather than the paralyzing action which results from larger and continued doses.

PRACTICAL METHODS FOR REDUCING FATIGUE. Nat. Safety Council, Safe Practices Pamphlet, No. 50, Nat. Safety News, June, 1922, 5, No. 6, 39–50.—After a definition of fatigue is given and the manifestations of fatigue are stated, about twenty-five personal or individual causes of fatigue are mentioned. Among the important factors causing fatigue are: poor health, personal worries, lack of adaptation to one's job, poverty, long hours of work, lack of amusement and recreation, and monotony in work. Enlargement of these factors, together with others causing fatigue, is made. This pamphlet may be obtained from the headquarters of the National Safety Council in Chicago.—M. C. Hamblet.

THE INFLUENCE OF MUSCULAR EFFORT AND CONSEQUENT THYROID STASIS ON THE FORMATION OF GOITER. *L. Mattioli.* Abstracted as follows from Rivista Sperimentale di Freniatria, Vol. 45. No. 1–2, in Il Lavoro, March 31, 1922, 13, No. 3, 88–90.—The author presents a series of anatomical and physiological studies which have a bearing on the causal relationship between muscular effort and goiter already observed by others. In the course of ten autopsies he examined the veins of the thyroid gland and came to the conclusion that the superior thyroid veins, because of their direction from below upward, are ill adapted, even during the state of repose, to favor the return flow of blood from an important part of the gland, as a result of which the upper part of the thyroid is more subject to venous stasis than the lower part, and the right lobe more than the left.

In mountaineers carrying their load on their shoulders as they climb, this stasis in the thyroid veins results in an increase in the circumference of the neck, as the author found in nine individuals. These men also showed a notable increase of pulsations, of respiratory effort, and in almost all there was increased blood pressure. To this effect on the venous system of the thyroid produced by the mountaineer's work is added another, a slowing of the flow in the internal jugular veins because the omohyoid muscles cannot, under these circumstances, contribute to the dilatation of the large veins of the neck, as they do normally.

These observations lead the author to believe that the peculiar work of the Italian mountaineer is calculated to provoke stasis in the thyroid gland and consequently to produce anatomical and functional changes

which influence the unknown agent that causes goiter; and that such work must therefore be regarded as a contributory cause of goiter. A confirmation of this theory is found in the progressive disappearance of goiter in parts of Italy where the carrying of heavy weights on the shoulder up the mountains is being abandoned, and transportation done by animals.—Alice Hamilton.

ENERGY EXPENDITURE IN SEWING. *C. F. Langworthy* and *H. G. Barott.* Am. Jour. Phys., Feb. 1, 1922, 59, No. 1, 376-380.—The authors summarize as follows: "The respiration calorimeter was used to measure the energy expended by a woman hemming by hand on various materials and at different speeds and doing similar sewing on a machine driven by foot power and by electricity. Little variation was found in the energy required for hand hemming on fine handkerchiefs, cotton sheets, 8-ounce cotton duck, and army blankets, the energy required for the actual sewing running between 5.5 and 5.8 calories per hour except in the case of army blankets where for some unexplained reason it was only 4.3 calories.

"When the speed was increased, the energy output increased proportionately. Hemming sheets on a foot-driven machine required about six times as much energy per hour as doing the same work by hand, but the energy used per meter of sewing was hardly one-half as great. When an electrically driven machine was used, the energy required per hour was not quite twice that used for hand sewing and about one-fourth that for the foot-driven machine; the energy per meter of sewing was about one-fifth of that measured on the foot-driven machine and less than one-tenth that of hand sewing. A three weeks' attack of influenza during the progress of the experiments made it possible to compare the energy output of the subject before and after the infection. For five weeks after apparently complete recovery her energy expenditure per kilogram of body weight averaged nearly 4 per cent. lower than before her illness."—M. C. Shorley.

ALCOHOL IN RELATION TO INDUSTRIAL HYGIENE AND EFFICIENCY. *T. Oliver.* Lancet, April 15, 1922, 202, No. 5146, 772.—Home conditions and habits, together with the nature of one's employment, influence alcoholism. By injuring the nervous system alcohol diminishes the ability to work, but as muscle food it is helpful, although the help is dearly bought. Many occupations, apart from the manufacture and sale of alcohol, create a desire for intoxicants; they are those productive of fatigue due to great physical exertion, overlong hours, exposure to heat or to dust. The alcohol habit is associated with increase in accidents and in irregular time-keeping. Conditions of work, as exposure to weather in shipbuilding, conduce to the habit. Sailors at sea are well behaved and sober, but on arrival in port with accumulations of pay they tend to break loose; here occupational customs exert a bad influence.

Before America banished alcohol, it could be said that teetotal nations, such as the Mohammedans in Asia and eastern Europe, were behind others in vigor and industrial progress. Experience does not teach that the man who uses alcohol out of working hours with care and moderation is inferior as a craftsman to the abstainer.—E. L. Collis.

THE USE OF ALCOHOL BY INDUSTRIAL WORKERS. *E. L. Collis.* Lancet, April 15, 1922, 202, No. 5146, 773.—(*Review by author.*) Alcohol contains some energy but it is not true food. It is, rather, a sedative drug with toxic properties. The development of industry saw a rise in alcoholism, probably aided by the drive of mass production with the need to keep the pace which tires and irritates the worker. Alcohol is a convenient sedative for blunting these sensations. Improved conditions of work with regard to wages, hours, and the supply of food lessen intemperance. Drink taken during working hours, as by dock laborers, is more injurious than when taken only convivially, as by coal miners. Investigations have shown that the sedative action of alcohol impairs those forms of sensitivity especially required for industrial work, and results in less output and more accidents; while its intoxicating properties are accountable for increase in labor turnover and lost time.

HAZARDS OF COMPRESSED AIR, DIMINISHED PRESSURE, GENERATION AND USE OF ELECTRICITY, AND ELECTRICAL WELDING

INDUSTRIAL CODE RULES (AS AMENDED) RELATING TO WORK IN COMPRESSED AIR TUNNEL CONSTRUCTION. New York State Dept. Labor, Bulls. No. 22 and 25.—Regulations relating to general tunnel construction, and to tunnels and caissons, are presented.—M. C. Hamblet.

WOMEN AND CHILDREN IN INDUSTRY

MATERNITY AND INDUSTRIAL WORK. *Pericle Carlini.* Reviewed in Il Lavoro, March 31, 1922, 13, No. 3, 90–93.—Carlini has collected the literature on the influence of industrial poisons on the pregnant woman, on parturition, and on the offspring, adding some personal observations. The poisons which form the subject of this book are tobacco, lead, phosphorus, mercury, arsenic, alcohol, ether, carbon disulphide, zenzine, antimony, trinitrotoluol, picric acid, and bichromate of potash.—Alice Hamilton.

WOMEN WHO WORK. New York State Dept. Labor, Special Bull. No. 110, April, 1922, pp. 40.—This report contains useful information about women in industry. Occupational figures are given for the United States and for New York with reference to women workers, also data relating to hours of work, wages, home work, and workmen's compensation. There are also data on health and trade union organization. The report closes with an abstract of the laws of New York State respecting the employment of women.

It is shown that of 4,504,791 persons gainfully occupied in the state of New York, 25 per cent. are women, and that 44 per cent. of all persons following professions in the state of New York are women. As a group, working women are younger than working men. The hours of their work are generally limited in mercantile establishments, factories and restaurants to nine hours a day, fifty-four hours in a week. Employment is prohibited between 10 o'clock at night and 6 o'clock in the morning. Two large groups —professional workers and those in domestic service—are not limited by law. Of 24,000 licensed home workers, about 18,000 are women. When we turn to the very important question of health, we are confronted with a most deplorable dearth of facts regarding the amount of time and wages lost on account of sickness. A recent study shows that the rate of illness is 50 per cent. higher for women than for men both in regard to the number of cases of sickness per thousand employed and in regard to the average loss of time per capita. Accidents in industry in 1920 are much more frequent among men (96 per cent. of the total number), but two classes of women in occupational life have no compensation for accidents—those in domestic service and those in agriculture.—G. E. Partridge.

NEGRO WOMEN IN INDUSTRY. U. S. Dept. Labor, Women's Bur., Bull. No. 20, 1922, pp. 65.—Negro women in industry in nine states — New York, Pennsylvania, Ohio, Illinois, Michigan, Indiana, Virginia, West Virginia, and North Carolina — were considered in preparing this report. One hundred and fifty plants were visited, employing 70,409 persons, of whom 40.5 per cent. were women, and 16.8 per cent. negro women. More than one-half of the negro women were employed in the tobacco industry.

The war brought into the industries many more negro women than had hitherto been employed, but it is clear that at the time the present study was made, the negro women did not have a permanent footing in industry, and that the numbers employed have been greatly reduced since the war.

Of all the women studied, about one-third were working ten hours or more a day. All of the employees in the peanut industry were working ten hours or more; of a total of 840 negro women in the textile industries, 680 were working ten hours or more, and nearly half of those working in the tobacco industry were in this same group. The greatest number, 37.4 per cent., were employed fifty hours per week. Gross faults in regard to over-

time working were found to be prevalent, and it was also found that a great many of the women had home duties in addition to their factory work. Many of the establishments allowed too short a period for lunch (eighty-eight had a half-hour period). The general working conditions were almost universally poor. Provisions for health service "varied from the best to the worst types." In eighteen establishments adequate and sanitary first-aid dispensaries were found under the supervision of trained nurses. In 128 places there were either no seats for these workers or only makeshifts.

Data are included showing the occupations of negro women in comparison with those of white women in a variety of industries; there are sections on wages, employment policies, education and training of workers, and efficiency. It is clearly shown that negro women in industry have proved themselves, as a class, dependable and capable.

The report ends with a study of home conditions of women workers in Virginia, consisting of an investigation by personal visits of the home conditions of eighty-five negro women employed in the tobacco industry.—G. E. Partridge.

CHILDREN OF WAGE-EARNING MOTHERS. A STUDY OF A SELECTED GROUP IN CHICAGO. *Helen R. Wright.* U. S. Dept. Labor, Children's Bur., Pub. No. 102, 1922, pp. 92.—This pamphlet concerns the effect of the employment of mothers upon the welfare of their children. The nature of a mother's work, her hours, the conditions under which she works, and her earnings, play such a large part in determining the welfare of her children that these conditions have been studied.

Special protection needed by the children of wage-earning mothers consists of protection which should be afforded them during the mother's working hours and measures that should be adopted in order that the children may not be deprived of proper care and attention by the mother during the hours she is at home.

The facts brought out in this report point clearly to the conclusion that industrial employment of mothers has many undesirable features. Chief among these may be mentioned the mother's absence from home, and the fatigue and ill health which inevitably occur when a woman shoulders two jobs. The connection of these factors with the children is obvious and calls for measures which will remove the necessity for mothers to work outside their homes. These measures will operate for the benefit of both mothers and children.—M. C. Hamblet.

INDUSTRIAL HOME WORK OF CHILDREN. A STUDY MADE IN PROVIDENCE, PAWTUCKET, AND CENTRAL FALLS, R. I. U. S. Dept. Labor, Children's Bur., Pub. No. 100, 1922, pp. 80.—The industrial home work of children in Rhode Island was brought to the attention of the Children's Bureau through the reports of inspectors charged with the enforcement of the federal child labor law of 1916. Detailed information, gathered largely through a canvass of the schools, was obtained for 2,338 of the 5,006 children under 16 years of age who had done home work during 1918. These children had been engaged on home work for thirty days or more during 1918 and had received compensation for their services. Almost one-third of the children had foreign-born fathers, representing twenty-four nationalities. The largest numbers of child workers lived in the Italian district; more than one-fifth of their families owned their homes.

The children worked on about 100 varieties of factory work, distributed by twenty-one industries. The principal occupations of the children, in the order of their importance, were carding snaps, stringing tags, drawing threads on lace, linking and wiring beads, setting stones, working on military buttons, carding shoe buttons, finishing underwear, carding jewelry, and putting together chain fasteners. Eyestrain from home work was reported by 117 children. School teachers reported that child home workers came to school listless and tired. A possible danger to the health of the community was found in the fact that large numbers of families reported that work was carried on at home while members of the family were ill with infectious diseases, while in many cases the sick persons took part in the work.—M. C. Hamblet.

INDUSTRIAL SANITATION: FACTORY CONSTRUCTION, ILLUMINATION, VENTILATION, HEATING, WATER SUPPLY, SEWAGE DISPOSAL

ATMOSPHERIC POLLUTION FROM SULPHURIC ACID PLANT FUMES. *James R. Withrow.* Chem. and Metall. Engin., May 24, 1922, 26, No. 21, 972-976.—This article, which reports the work of the Atmospheric Pollution Committee of the American Institute of Chemical Engineers, contains a discussion of the importance of the fume problem to the chemical manufacturer from the standpoint of public health, legislation, and economical operation. The author compares the situation in this country with that prevailing in Great Britain and Germany, and intimates that the sulphuric acid fume nuisance can be lessened by more efficient plant operation. He discusses present methods of determining the percentage of fumes escaping into the air, and the effect of humidity, light, temperature, and duration of exposure in connection with vegetation exposed to sulphuric acid fumes. —P. Drinker.

THE INDUSTRIAL SMOKE PROBLEM. Abstracted as follows from Wärme u. Kälte-Tech., 1922, 24, 20-34, by J. L. Wiley, in Chem. Abstr., May 20, 1922, 16, No. 10, 1657.—"The injurious constituents of industrial smokes and fumes and their effect on vegetation are discussed."

THE ELIMINATION OF INDUSTRIAL ORGANIC ODORS. *Y. Henderson* and *H. W. Haggard.* Jour. Indust. and Engin. Chem., June, 1922, 14, No. 6, 548-551.—This article contains a description of the authors' patented process (U. S. Patent 1,410,249) involving the admixture of small amounts of chlorine, as a deodorant, with the gaseous emanation from offensive organic matter. Chlorine is supplied from tanks, and involves only equipment in current use in the chlorination of water. It is pointed out that the gaseous volume of material actually odoriferous is extremely small, so that far less chlorine is needed than if the decaying organic material itself were to be deodorized by the same method. Certain details of the process as installed in a garbage-treating plant in New Bedford are given.—P. Drinker.

SPRING HOUSE CLEANING IN THE INDUSTRIAL PLANT. *G. A. Kuechenmeister.* Nat. Safety News, March, 1922, 5, No. 3, 11-12. —This article concerns plant cleaning. Assuming that the method of cleaning, whereby an entire establishment is turned into confusion for several days annually, is obsolete, the author states that by keeping windows clean, by improved lighting, by the methodical arrangement of articles, and continuous sweeping, the spring house cleaning of the industrial plant will no longer be necessary. —M. C. Hamblet.

INDUSTRIAL CODE RULES (AS AMENDED) RELATING TO LIGHTING OF FACTORIES AND MERCANTILE ESTABLISHMENTS. New York State Dept. Labor, Bull. No. 18, May 1, 1922. —The State Industrial Commission of New York has amended its labor laws relating to lighting of factories and mercantile establishments by establishing definite requirements for the measurement and intensity of illumination. The minimum intensities of thirty-two industries are given. — M. C. Hamblet.

A SURVEY OF NATURAL ILLUMINATION IN AN INDUSTRIAL PLANT. *C.-E. A. Winslow* and *L. Greenburg.* U. S. Pub. Health Ser., Pub. Health Rep., April 14, 1922, 37, No. 15, 876-887.—This is a study of daylight illumination in a large munition factory, referring especially to the indoor-outdoor ratio as an index of such illumination. Measurements in forty typical workrooms were taken with the Macbeth Illuminometer. The general results were good, with only 10 per cent. of all observations (402) falling below 2 foot-candles, and 65 per cent. were over 10 foot-candles. The indoor-outdoor ratio has certain limitations, but a common sense interpretation of the results will yield findings that are probably more significant than direct readings of indoor daylight illumination.

"It may be tentatively concluded that in summer an indoor-outdoor ratio of 0.4 per cent. will almost always give a direct illumination of over 2 foot-candles, generally a value

of over 4 foot-candles. On the other hand, a workroom with an indoor-outdoor ratio often falling below 0.4 per cent. is likely to show a considerable proportion of observations below 2 foot-candles.

"Two foot-candles of direct illumination, or 0.4 per cent. of the outdoor illumination at a given time may perhaps be taken as a tentative standard for general daylight illumination in such an industry as small-arms manufacture, with special illumination at particular working planes where inspection and other fine work are carried on."—B. Cohen.

NOTES ON THE EFFICIENCY OF VARIOUS SYSTEMS OF AIR-CONDITIONING IN A MUNITION FACTORY. *C.-E. A. Winslow* and *L. Greenburg.* U. S. Pub. Health Ser., Pub. Health Rep., Feb. 10, 1922, 37, No. 6, 275.—Notes on artificial and natural ventilation in use in a shell manufacturing plant accompany charts and tables of extensive readings from psychrometers, kata-thermometers, and carbon dioxide in parts per 10,000 of air. The authors conclude that shops with only the normal heat hazard can be greatly improved by common sense and the judicious use of thermometers, while heat hazards of a high degree of intensity can be adequately controlled during cool weather by properly designed and operated systems of fan ventilation. In summer the excessive heat can be reduced only by artificial cooling and in the absence of this desideratum short working shifts are recommended.—P. Drinker.

HAVE YOU A GOOD DRINK OF WATER IN YOUR PLANT? *G. E. Wallis.* Nat. Safety News, May, 1922, 5, No. 5, 27-29.—In this article there are presented several methods of supplying cool drinking water to employees in industrial establishments.

The two most important factors to be considered in planning the drinking water system are: first, the source from which the water is taken (many plants use the municipal water supply although it is cheaper to use an artesian well and pump the water through the plant); and, second, the water distribution within the plant itself (most industries use a system including filtration, refrigeration, and continuous circulation). After the passage of the water through a pressure filter, it may be conducted to a cooling and supply tank from which it is pumped to the fountains in the plant.

Investigations indicate that the bubbler fountain throwing a vertical stream of water is still a source of disease, germs often being bounced up and down at the top of the vertical stream for eighteen hours. The type of fountain that throws a stream at an angle so that dust or germs cannot fall into the mouth of the fountain is more sanitary.—M. C. Hamblet.

INDUSTRIAL MEDICAL SERVICE: MEDICAL DISPENSARIES AND HOSPITALS IN INDUSTRIAL PLANTS

FIRST AID SERVICE IN FEDERAL BUILDING. Hosp. Management, March, 1922, 13, No. 3, 58.—The government has recently established dispensaries in several federal buildings in the East and in Chicago, and has now under consideration the extension of this project. The building at Dearborn and Adams Streets, Chicago, a center for about 7,000 employees, was the first post-office building to establish first-aid service, and in the short time it has been operating the service has given such good results that larger quarters are being prepared. During February, 1922, there were 3,882 calls for dispensary service, largely minor cases. First aid, alone, is provided by the dispensary at the present time, but the service is under the direction of United States Public Health Service Hospital No. 30, which cares for all cases requiring hospital treatment. A twenty-four-hour service is provided, with three shifts of physicians and nurses.—G. E. Partridge.

ABSTRACT OF THE LITERATURE

OF

INDUSTRIAL HYGIENE

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GENERAL

INFLUENCE OF INDUSTRIAL EMPLOYMENT UPON GENERAL HEALTH. *Major Greenwood.* (Milroy Lectures.) Brit. Med. Jour., April 29, 1922, 1, No. 3200, 667-672; May 6, 1922, No. 3201, 708-713; and May 13, 1922, No. 3202, 752-758.—The wide erudition of the lecturer is displayed in his references to ancient industry drawn, for the most part, from writers during the Roman Empire; but not from them, not even from Galen, is information forthcoming as to the influence of industry upon the health of the laboring classes. With the single exception of the writings of Ramazzini the search for information proves fruitless, until the industrial revolution of the eighteenth century had profoundly altered methods of production and the life of the workers.

Dr. Greenwood is essentially an epidemiologist, an expert in the use of his own methods of inquiry. First he compiles a picture of the health of the working classes at the close of the eighteenth century and at the beginning of the nineteenth, and then proceeds to the Victorian era, thus arriving at the period of reliable vital statistics. Here the time of British industrial supremacy is found associated with an improvement in adolescent mortality, but with a deterioration in adult mortality, most pronounced in industrial districts. Simultaneously legislation was protecting the health of adolescents and of women by reducing their hours of work and improving conditions of labor. Adult mortality is found lagging behind and only improves as the survivors of the lessened adolescent mortality advance through adult life.

At this time English mortality is found to be higher than that of non-industrial Sweden up to about 40 years of age; after this age it is lower. Late in the century Sweden developed industrially but made little effort to protect juvenile labor; then the position was reversed. Although in both countries some fall in mortality at each age-period has occurred, today Swedish mortality exceeds that of England up to 35 years of age, but thereafter it is lower. The extremely unfavorable position in Sweden between ages 15 and 25 is attributable to industrial employment. Modern industrial life connotes urbanization; and the influence of town environment, as contrasted with rural conditions, has to be considered before any alteration noted may be ascribed to factory life. Hence the influence of migration from country to town is reviewed and the suggestion is made that adolescent migration may perhaps increase mortality in *both* populations—rural mortality by withdrawal of those best fitted to rural conditions; urban mortality by introduction of those ill adapted to urban conditions.

Tuberculosis is taken as an index disease—a more delicate index of hygienic conditions than general mortality; and records presented show that now in Sweden, which today is industrially at the position where England stood fifty years ago, mortality from the disease is at its maximum for both sexes at ages 20 to 30 (instead of in late adult life as it was one hundred years ago); whereas in England and Wales it is at its maximum for females at ages 35 to 45, and for males at ages 45 to 55. Similarly in Japan where this disease has tended to increase in recent years, the excess over English rates is most marked at ages 20 to 30. Four English towns—Reading, Northampton, Bolton, and Warrington—representing different industries, are closely contrasted from the points of view of climate, housing, and wages; the evidence appears to support an inference that industry in each case accentuates any climatological tendency to disease already existing, but no one industrial factor inimical to life is revealed by the investigation.

The lecturer then proceeds to examine the mortality of particular industries, using for the purpose English occupational data for 1910-1912. Here, taking the mortality of the clergy as a standard, he finds evidence from the boot trade that change of industry from home to factory has not been *relatively* favorable at earlier years, and has resulted in an undue prevalence of phthisis. Nevertheless it does not follow that an industry of which phthisis takes a heavy toll is an unhealthy industry, since mortality from other causes may be lower than usual; nor does it appear that the problem of phthisis-ridden industries is exclusively a problem of the recruitment of weaklings.

The reader is carried forward to the conclusions that the accepted ill effects of industry are not to be found in specific unhygienic conditions, but rather in the changes in methods of life imposed by modern industry upon populations not yet accustomed to them. These changes may be associated with (1) alterations in diet; (2) reduction of bodily exercise; and (3) the immediate effects of atmospheric change. Each of these influences is then discussed; nutrition as a factor determining the result of infection is held to be most responsible; bodily exercise calls for further investigation; but by studying and remedying defects in ventilation the resistance of the worker to the procatarctic factors of disease may be strengthened.

These lectures contain such a mass of facts and careful deductions that an adequate summary is impossible. Only reference to the original can give the reader a full appreciation of the writer's work.—E. L. Collis.

Industrial Diseases. *T. M. Legge.* Ann. Rep. Chief Inspect. Factories and Workshops for 1921. Cmd. 1705, 1922, pp. 66-82.—An increase in the number of medical inspectors is reported which is permitting more special investigations to be undertaken, including an inquiry in industries in which there is danger of silicosis owing to exposure to dust. Probably owing to trade depression the number of notified cases of poisoning is lower than for the previous year. Deaths from lead poisoning have by no means grown fewer; there were twenty-three in 1921 with 230 notified cases, as compared with an average for 1902-1905 of twenty-three deaths with 601 notified cases. The secret is that deaths concern old chronic poisoning established before modern preventive measures were adopted, while the reduction in notified cases represents the immediate results of these measures. These results are also to be found in lessened severity in the cases; thus lead palsy was present in only 7.4 per cent. in comparison with 12.7 per cent. for the five years, 1910-1914.

Special reference is made to risk from using the oxyacetylene flame on painted steel

plates in breaking up old battleships; at the high temperatures generated 49 mg. of lead are given off as fumes in ten cubic meters of air, as compared with 3.4 mg. in the process of burning off lead paint with an oxygen and gas flame. At the same process Dr. J. C. Bridge found men cutting galvanized plates, suffering from typical brass founders' ague, due to inhaling zinc fumes of which there was risk of inhaling from 12 to 25 mg. daily.

For a diminution in cases of anthrax, from seventy-two in 1918, fifty-seven in 1919, forty-eight in 1920, to twenty-five in 1921, some credit is given to the inauguration of the station for disinfecting wool in bulk, at Liverpool; here material suspected of carrying infection, such as Egyptian wool and East Indian goat hair, has to be disinfected on imports before sale.

In the discussion of accidents from gassing, stress is laid on the importance of rest during the rendering of first aid, and rescuers are warned against walking victims up and down in their desire to be "doing something." Artificial respiration, warmth and rest are the essentials of treatment; premature exercise may be fatal. A special inquiry among workers employed in aniline black dyeing disclosed a diminution in hemoglobin, a fall in the number of red corpuscles and of white corpuscles with a relative increase in lymphocytes. Anemia and pallor were present, and also cyanosis, lassitude, and tremor; headache, drowsiness, dizziness, and loss of appetite were complained of. The symptoms were most prevalent at the process of dry ageing, and increased with the number of hours worked per week. Similar symptoms were also found among men employed at sieving paranitraniline.

The work of certifying factory surgeons is carefully reviewed and its value appraised. Extension of their work is recommended from merely dealing with certificates of fitness of young persons to giving medical advice and supervision of first-aid work. The chief medical reason for refusal to certify was the presence of pediculosis even though one officer found it impracticable to reject for this alone, since nits were present in the hair of about 30 per cent. of female workers, juvenile or adult. Close co-operation is needed between the surgeons and juvenile employment authorities, on the one side, and factory nurses and welfare supervisors, on the other.—E. L. Collis.

Dangerous Trades. *G. Stevenson Taylor.* Ann. Rep. Chief Inspect. Factories and Workshops for 1921. Cmd. 1705, 1922, pp. 33-49.—This article deals with progress in those industries which on account of some special risk to life or limb are certified as dangerous. The writer points out that active co-operation between occupiers and workers is necessary to reduce the toll of industrial diseases and accidents.

The chief risk of plumbism in making electric accumulators is found to be in lead burning processes, which can be made safer by efficient exhaust ventilation; vacuum cleaning appliances are advantageous for removing lead oxide dust which accumulates inside the shops. In dockyard work the main risk is from accidents; safety devices on winches, lifting gear and ladders, together with improved illumination, are effecting improvements.

In cotton and woolen mills personal carelessness is reported as causing accidents from self-acting mules, and steps have been taken to warn and prosecute workers. In contrast anthrax in the woolen trade is due to infected material, and only disinfection can remove the risk; this is now being undertaken centrally at Liverpool as the wool reaches port. The same applies to the manipulation of horsehair; and pressure is exerted to insure disinfection of hair coming from China, Siberia, and Russia, but difficulty is frequently experienced in tracing the country of origin of some special batch of hair.

Dust removal and suppression in the grinding trade and in the refractories industry are better carried out than heretofore; yet much remains to be done before the risk of silicosis is abolished. In various lead industries improvements are reported; by replacing common tinning in tinning of hollow-ware with pure tinning, exposure to lead fumes is diminished; on the other hand, in making pottery, low solubility lead glazes are replacing leadless glazes, but as they are also supplanting ordinary lead glazes, the balance is on the side of lessened risk; improved furnaces for lead smelting are improving working conditions; a new code of regulations for the manufacture of compounds of lead, that is, white lead, is

working satisfactorily. Taken as a whole the author tells a story of considerable advance in factory hygiene.—E. L. Collis.

Occupational Hazards and Diagnostic Signs. *Louis I. Dublin* and *Philip Leiboff*. U. S. Dept. Labor, Bur. Labor Statis., Bull. No. 306, April, 1922, pp. 31.—The Monthly Labor Bulletin of the United States Bureau of Labor Statistics, March, 1922, contained the first edition of this guide to the hazards of occupations and to the symptoms of the diseases which they cause.

A revised edition has recently been prepared, including abnormalities of temperature, compressed air, dampness, dust, extreme light, infections, poor illumination, repeated motion, pressure, shock, etc., and the poisons.

In preparing this revision the whole literature of industrial hygiene has been carefully examined, and the larger number of the more important occupations and hazards are now included.—M. C. Hamblet.

Factory Inspection in Sweden in 1920. Reviewed from Kungl. Socialstyrelsen: Yrkesinspektionens verksamhet, ar 1920, pp. 151: Stockholm, K. L. Beckmans Boktryckeri, 1921, in Internat. Labour Rev., June, 1922, 5, No. 6, 1004-1007.—The industrial inspection service of Sweden is responsible for the supervision of all employment except home work and nautical work. The central staff is aided by communal inspection authorities who oversee commercial and small industrial establishments. In 1920 there were also ten special inspectors. The total number of workplaces on the registers in this year was 44,310. In all, notices of defects were sent to 2,734 occupiers, and proceedings were taken in regard to 374 separate contraventions. Many of these notices related to the employment of young persons, especially to the failure to notify of their employment or to see that they had the required certificates. Some difficulty was experienced by the inspectors in explaining the new legal provisions respecting hours of work, and various problems of adjustment in this respect were met.

The accident returns are far above the prewar figures because of the change in the basis on which the statistics are compiled. For the year there were reported 37,195 accidents, including 348 fatalities, in industry; and 2,110, with twelve fatalities, in mining. In general the causes of accidents are not tabulated, but it is stated that agricultural machines caused 205 accidents of which eight were fatal, and that 982 persons were injured, eight fatally, loading or unloading vessels. There were 2,171 accidents on railways, of which thirty-three were fatal. Half of the fatalities occurred in shunting and coupling. In connection with electrical installations there were sixty-four accidents, of which twenty-three were fatal. Most of the more notable accidents were due to the explosion of steam boilers.

In connection with safety and hygiene, the report contains many illustrated notes. Especially useful devices are described; and also model installations, such as ventilation and dust-extracting systems, workers' lavatories and a guard for calender rolls. Dock work is given a special place in the report and it is said that there has been a distinct improvement in the supervision and testing of lifting apparatus.

There are returns on the medical examination of young persons. In 1920 there were 44,965 persons under 18 years of age recorded as being employed. Of these 2.4 per cent. were found to have deformities or outward defects; 1.6 per cent. had heart troubles; and 1.2 per cent. defects of vision. In many cases change of work was recommended and all employment was prohibited for 15 per cent. of the tuberculous cases. Criticism is made of the living conditions of the forest workers. —G. E. Partridge.

SYSTEMIC OCCUPATIONAL DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

Preventive Measures Effective in Cardiac Diseases. *Louis I. Harris.* Nation's Health, Feb. 15, 1922, 4, No. 2, 74-77.—In campaigns against preventable diseases, one should not place too much confidence in the idea that education by itself will remedy conditions. Economic pressure, as well as ignorance and indifference, tends to render advice

alone ineffectual. Those who cannot afford to be examined by their own private physicians should be examined at the nearest Health Department clinic. The public must be persuaded to support more clinics and larger personnel, and to make possible the expansion of preventable disease work so that it will not be limited as at present to the prevention of tuberculosis alone.

Some method of vocational guidance and placement should be organized for persons of adolescent years who are about to enter industry, in order that those suffering from cardiac defects may be safeguarded. Those whose work involves marked fatigue should work fewer hours and should rest during certain prescribed periods. Cardiac patients under mental strain should be closely watched. Cardiac housewives should receive the assistance of paid day-helpers.—L. A. Shaw.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

OBSERVATIONS AND EXPERIENCES WITH CASES OF CARBON MONOXIDE POISONING IN THE MINE-DAMP EXPLOSION IN THE FRIEDEN MINE AT OELSNITZ. *W. Gorn.* Zentralbl. f. Gewerbehyg., April, 1922, 10, No. 4, 97-107.—Detailed case reports are given for the seventeen men injured in this explosion. The cases are divided into three groups: the first showed carbon monoxide in the blood, and had objective but not obvious neurological symptoms; the second group had severe burns in addition; and the third had severe enough effects of the carbon monoxide and the burns to cause great damage to the central nervous system and the circulation. In three cases large amounts of inspired or swallowed coal dust may have been an additional factor. The burns seemed to be the major cause of death.

The symptoms displayed were excitement followed by apathy, thirst, and retrograde amnesia. There were no paralyses or convulsions observed. The disturbance of the pupillary reaction seemed a criterion of the severity of the effect of carbon monoxide on the nervous system. Gorn argues at length that the damage caused by carbon monoxide is a direct intoxication of the nerve cells, and is not merely due to replacement of oxygen.

Treatment consisted in intravenous injection of adrenalin and strophanthin to stimulate circulation. Camphor was found ineffective. Oxygen was given by the Draeger apparatus, but was evidently not considered useful. Other possible lines of therapy are discussed.—E. L. Sevringhaus.

UNILATERAL FLACCID PARALYSIS FOLLOWING CARBON MONOXIDE POISONING. *Jaksch v. Wartenhorst.* Wien. klin. Wchnschr., 1922. 35, 262.—At least three such cases have come under the observation of the author. There is evidence of severe brain lesions. All showed (1) rise in temperature, (2) leukocytosis, and (3) transitory glycosuria.—B. Cohen.

THE TANNIC ACID METHOD FOR THE QUANTITATIVE DETERMINATION OF CARBON MONOXIDE IN THE BLOOD. *R. R. Sayers* and *W. P. Yant.* U. S. Bur. Mines, Rep. Investigations, Ser. No. 2356, May, 1922, pp. 7.—The authors summarize as follows:

"We believe the method described is particularly adapted to the requirements for determination of poisoning by CO gas. It can be used for either a quantitative estimation or in the absence of a set of standards it can be used as a qualitative test, the comparison in the latter being made with a single standard immediately prepared from 0.1 c.c. of the blood of an unexposed subject (very conveniently the person making the test). As support of the foregoing, the following conclusions are offered:

"1. The small quantity of blood needed can easily be obtained without objection on the part of the patient.

"2. The solutions used are cheap, common, and easily made. The apparatus used is simple and inexpensive.

"3. The actual time of making an analysis is not more than 3 minutes, and results can be obtained in 8 to 10 minutes.

"4. The accuracy is well within the required limits.

"5. No great skill or special training is necessary for securing good results.

"6. The method automatically corrects for any dissociation of carbon monoxide-hemoglobin due to the dilution with water.

"7. The results are more easily obtained, and are as a whole more dependable than with any other method tried."—M. C. Shorley.

PHYSIOLOGICAL EFFECTS OF EXPOSURE TO LOW CONCENTRATIONS OF CARBON MONOXIDE. *R. R. Sayers, F. V. Meriwether,* and *W. P. Yant.* U. S. Pub. Health Ser., Pub. Health Rep., May 12, 1922, 37, No. 19, 1127-1142.—The conclusions drawn from this investigation are:

"1. The combination of CO with hemoglobin takes place slowly when the subject is exposed to low concentrations and remains at rest, many hours being required before equilibrium is reached.

"2. The combination of CO with hemoglobin takes place much more rapidly during the first hour of exposure than during any succeeding hour, with the subject remaining at rest.

"3. Strenuous exercise causes much more rapid combination of CO with hemoglobin than when the subject remains at rest. The symptoms of CO poisoning are emphasized by exercise.

"4. High temperature and humidity, with a given concentration of CO, cause more rapid combination of CO with hemoglobin than do normal conditions of temperature and humidity.

"All symptoms and effects described in this paper are called acute in character. None of the subjects has shown any permanent deleterious effects from exposure to CO."—B. Cohen.

PATHOLOGICAL LESIONS PRODUCED IN THE KIDNEY BY SMALL DOSES OF MERCURIC CHLORIDE. *M. L. Menten.* Jour. Med. Research, June-July, 1922, 43, No. 3, 315-319.—The author summarizes as follows:

"Intravenous injections of mercuric chloride in amounts as low as 0.00002 gr. per kg. of weight cause microscopical pathological changes in kidney and liver of the rabbit. These lesions are well defined five minutes subsequent to the termination of the injection."

INHALATION OF PETROL. *A. W. St. Ledger.* Abstracted as follows from Med. Jour. Australia, March 18, 1922, 1, No. 11, in Jour. Am. Med. Assn., May 27, 1922, 78, No. 21, 1668.—"While attempting to clear the petrol (gasoline) pipe of his car, Ledger's patient had sucked a considerable amount into his mouth. As this happened he caught his breath and some of it went down the wrong way. Immediately he had an acute pain in the right hypochondrium, stabbing and colicky in character, and much increased by respiration. The respiration was short and jerky and his breath smelt distinctly of petrol. There was no cyanosis or coughing. The respiratory movement seemed inhibited on the right side. The epigastrium was rigid and immobile. The rigidity was pronounced and accompanied by distention and tympany. There had been no vomiting. Six hours after admission he commenced coughing; the sputum was tinged with blood. The hemoptysis increased and with the increase of the pulmonary signs the abdominal signs became less definite and the picture changed to an acute pleuritic condition. Subsequently a marked effusion occurred and persisted for fourteen days. The fluid was gradually absorbed; tapping was not necessary. This case is of interest from the comparative rarity of its cause and the acute and confusing signs that resulted. Ledger regards the hemoptysis as due to a mechanical distention of the bronchioles, brought about by sudden volatilization of aspirated petrol. The abdominal signs were evidently referred through the intercostal nerves; the pleuritic effusion was secondary to the trauma."—C. K. Drinker.

LEAD POISONING. *F. Heim, E. Agasse-Lafont,* and *A. Feil.* Abstracted as follows from Bull. méd., Paris, March 18, 1922, 36, No. 12, 223, in Jour. Am. Med. Assn., May 6, 1922, 78, No. 18, 1424.—"Heim and his co-workers describe the two findings which warn of injury from lead even before the plumbism is well established. The number of leukocytes is usually normal, but about 40 per cent. may be mononuclears. The erythrocyte figure is also normal in the presaturnism phase. When the workmen are once saturated with lead, there is pronounced anemia, which is very slow in receding, even when there is no further contact with lead. The erythrocytes may show a basophil plasma or basophilic granules, and the latter is the earliest and

most constant sign of injury from lead. They have found it in 50 per cent. of all persons exposed to lead poisoning, regardless of whether they showed any signs of plumbism or not. This basophilic granulation is not found outside of lead poisoning except, inconstantly, in very severe anemia or certain grave intoxications. The granules show as fine black spots, some as fine as dust, others a little larger, scattered irregularly through the protoplasm. The other pathognomonic finding is the presence of lead in the urine, but the technic required to detect it is tedious, even with electrolysis and the colorimeter. They never found any lead in 100 normal urines tested, while it is constantly present in lead poisoning, as a large proportion of the lead is eliminated through the kidneys. The spinal puncture fluid may also show the presence of lead; in one of their cases this first explained a puzzling brain affection.''—C. K. Drinker.

Measures for the Protection of the Health of Workers in Lead-Color Factories, and of Painters in Germany in 1920-1921. *K. B. Lehmann.* Zentralbl. f. Gewerbehyg., Feb., 1922, 10, No. 2, 46-51.—Following an investigation made at the invitation of owners of white lead factories, the author reports these observations. In regard to the hygiene and technical protection of workers there was evidence of great care. He considers that the chief risk now occurs at times when, through the failure of a machine to function properly, lead dust escapes into the air, and that the danger is rather to those persons who make small repairs about the plants.

The general appearance of the workers was good. Lehmann considers this condition due to the wartime interruption of their occupation, but he notes especially the apparent resistance of the ''old-timers.'' He summarizes his examination (which will be published in detail later) with a table showing that approximately 70 to 75 per cent. of the workers displayed no distinct signs of lead effect. In considering his table he emphasizes the fact that 27 per cent. of the workers were 50 years of age. He closes with a table showing the reduction of cases of sickness and of sick days from 15 per cent. and 3.3 sick days in 1912 to 1914, to 3.6 per cent. and 0.75 sick days in 1919 to 1920. These figures are based upon the records of full-time workers. He regards this reduction as due to: (1) strict government legislation discussed in 1912 and carried into effect in 1920 (the making of pulp lead instead of lead ground in oil, dust protection, mechanical packers, and leaflets for workers, etc.); (2) improved status of workers and lessened turnover; and (3) greater care in the diagnosis of lead poisoning through the education of factory physicians.

In general the author thinks that dangers to white lead workers have decreased and can be still further reduced by the conscientious application of the most recent information regarding lead poisoning. Hazards in the painter's trade are considerably less than represented in many statistics.—J. W. S. Brady.

Tetralin Poisoning in Painters. *Alfred Arnstein.* Wien. klin. Wchnschr., 1922, 35, No. 21, 488.—Two painters were at work in a bank vault for three days. Tetralin (tetrahydronaphthalene) caused early irritation of the mucosa, also headache and stupor. The most striking symptom was a dark green coloration of the urine. The symptoms disappeared when the men stayed away from the work.

Tetralin is used a great deal in industry as a substitute for turpentine. Among other things, it is used in the preparation of floor wax, and it thus offers opportunity for the poisoning of many people.—B. Cohen.

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

Occupational Injuries to the Mouths and Teeth of Glass Blowers. *Hans Reichert.* Zentralbl. f. Gewerbehyg., Jan., 1922, 10, No. 1, 1-7.—The author emphasizes the fact that accounts of the investigations of specific dangers to the mouths and teeth of glass blowers have been neglected in literature. The author's investigation of the glass blowing industry is confined to the injuries of the mouths and teeth of workers, and discloses the following observations:

1. There occurs frequent transmission of

lues and tuberculosis, not to mention usual mouth-throat infection, from the use of a common mouthpiece on the blowing pipe.

2. The formation of large furrows or pockets in the mucosa of the cheeks is due to overdistention by blowing. This is found in about 90 per cent. of all workers examined.

3. Pneumatocele of Stenson's duct and the parotid is found in 12 per cent. of all examined.

4. The teeth are damaged. The author describes and illustrates with a photograph a characteristic abrasion of the incisors — especially the two upper centrals — produced by rotation of the pipe while blowing. He discusses the resultant injury to the appearance, speech, and the digestive tract.

Further injury is the loss of teeth caused by the "kick" backward when blown glass bursts. In addition sideways displacement and rotation of teeth from constant pressure, fissuring of the enamel and an unusual amount of caries, which he considers due to a high iron content of the saliva from the iron pipe, are common among the workers.

In conclusion he suggests the use of an individual mouthpiece of some softer material to protect mouth infection; the replacement of injured teeth by false ones; and prophylaxis against caries. The problems of abrasion and displacement of the teeth are not at present to be solved. The article ends with an excellent list of references.—J. W. S. Brady.

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

Le Bouton d'Huile. And Forms of Occupational Acneiform Folliculitis. *Paul Blum.* Bull. de l'inspection de travail, 1920, Nos. 3-6, 321-346.—A condition of the skin is described among metal workers in ammunition works in St. Denis, popularly called by the occupier and worker *bouton d'huile*, or oil pimple.

This condition was first described by Purdon of Belfast in 1867 in young girls, cleaning and oiling spindles, and later by Leloir at Lille in 1889 among spinners in cotton mills. The latter thought that it was due to a tarry resinous substance in solution.

In 1901 Dubreuilh described a case of industrial acne due to contact with mineral oil in an iron worker, who plunged metal plates into mineral oil and then carried them to a stamping machine; he considered it a special form of acne and the first stage of a disease of increasing gravity, such as is found in petroleum refiners.

According to Dr. Blum's researches in shell factories and engineering works, the oil is only a vehicle, although the quality of oil is important; soluble oil is harmless, whereas pure mineral oils and lard oil are more harmful than vegetable oils. The disease occurs more frequently where oil is used in abundance and is recovered for further use. The true cause is the dust contained in the oil. The action is mechanical, chemical, and inflammatory, with secondary infection produced by microbes from the dust, from recovered oils, from the skin, and from the worker's clothing.

Dr. Blum proposes to give to this affection the name *follicular elaiokoniosis* (from the Greek words for oil and dust). The onset is slow and first manifests itself in three or four weeks, but occasionally in fifteen days, by moderate itching. At this period papules are rare, but some black specks on the back of the hands and a few scratches on the forearm may be seen. He describes the following stages:

Stage 1.—Follicular punctuation (called by Thibierge "inking" of follicles). The black spots are not superficial and cannot be removed by soap and brush. The typical position is on the dorsum of the fingers, hands, and forearms; but occasionally on the abdomen, as, for instance, when a worker carries a shell; and rarely on the lower limbs, where the rubbing of the trousers soon makes it papular and pustular; and more rarely on the forehead and cheek.

Stage 2.—Pseudo-comedo or "false acne" with hyperkeratosis of the follicular orifice. The black part consists, not of keratin as in true acne, but of a mixture of metallic dusts and inflammatory cells. The typical position is first on the front of the forearm and then on the hands. Iron, chrome, zinc, nickel, and copper have been found in the pseudo-comedo, also staphylococci, and very rarely streptococci, but never coccobacilli.

Stage 3.—Papular perifolliculitis, which is

slightly itchy and of a dull red, violet, or coppery color. The conditions may remain at this stage.

Stage 4.—Papulopustular pus may escape or a boil may form. The different stages are rare in the same subject at one time.

For the purpose of differential diagnosis in various stages the following must be borne in mind: burns from boiling oil, impetigo, scabies, impregnation by coal dust, pityriasis rubra (but this lasts for a long time), true acne, phthiriasis, syphilis, and tuberculosis of the skin, variola, skin lesions caused by drugs (such as iodides and bromides) or by occupation. In connection with the latter he mentions acneiform folliculitis caused by cade oil, beech oil and birch oil, by cement, by distillation of coal tar, especially in paraffin workers, and he asks whether this is due to the paraffin or heavy oils which keep in suspension such irritants as caustic soda.

He discusses chimney-sweeps' cancer, which he says is rarer in France than in England, probably because less coal is used in France and also because it has been subjected to a separation process, and mentions that Bayet was struck by the analogy to chronic arsenical poisoning.

He describes the lesions in so-called chloride acne of makers of chloride of lime or soda by electrolysis, with papules and pigmented spots on the face, neck, trunk, limbs, and scrotum, usually accompanied by gastric and pulmonary disturbances, where the action is internal and external, the chloride being eliminated by the glands and the hypochlorite of soda inflaming the orifice of the sebaceous glands.

The mechanical theory of acne of Virchow and Kaposi is opposed by the French School, on the ground that talc dust rarely gives trouble, and workers in aluminum bronze powders get only an eczematous dermatitis, and workers in sulphur, saltpetre and bisulphide of arsenic do not get acneiform folliculitis.

The treatment of elaiokoniosis is by soap and water, and by careful massage, in order to express the contents of the follicles. The open orifice of the follicles should then be touched with iodine, followed by the application of a lotion containing sulphur, glycerine, and possibly camphorated alcohol, which must be allowed to dry on. For the boils tin oxide may be given internally.

From a medico-legal aspect, everything points to its being an occupational disease and not an accident.

As a preventive measure, wash basins, soap, and brushes should be provided, also clean overalls (preferably impermeable), which should be the property of the workers and should not be passed from one person to another, and there should be a cloakroom. Clean oils should be provided and not used to extinction by continued recovering. Chassevant has persuaded occupiers to wash recovered oil with alkaline solution and to filter it. Dr. Blum lays stress on the value of medical supervision in the factory.—S. A. Henry.

A Form of Industrial Dermatitis. *Allison D. McLachlan.* Glasgow Med. Jour., April, 1922, p. 212.—This dermatosis, caused by the cutting compounds used in engineering works, affected seven out of 200 operatives examined by the writer. He feels sure that not a few other cases escaped his notice and that such cases are frequently overlooked by industrial surgeons, or else are usually grouped under the general heading of septic sores.

The lesions are symmetrical, are seen in the interdigital spaces, on the backs of the hands and the cuff areas of the forearms. They are usually ill defined, slightly raised, infiltrated, itching, red, scaly patches, or may develop as vesico-pustules or bullae. McLachlan finds them most rebellious to treatment unless work is suspended.

On analysis, he found that these cutting compounds consisted essentially of an emulsion of soap, oil (mineral), and water. As the same fluid, by pumping, is made to circulate so as to cool and lubricate certain parts of each machine and then fall into open trays, it becomes freely contaminated. The writer examined the bacterial content of his own samples and gave the recorded findings of other investigators also. He arrived at the conclusion that, at the present time, bacteriological evidence only warrants our belief that the organisms found may be a source of secondary infection which is initiated by the chemical and physical properties of the oil, etc.

Among other observations he emphasizes

the following: That the condition noted arises solely from occupation; that the affection is of more frequent occurrence than is generally supposed; that personal and occupational hygiene are important; that the employees should refrain from using oily rags, and should make use of the conveniences provided for cleansing purposes.—R. Prosser White.

A Case of Apparent Cataract Following Injury with Copper Fragment. *Alois Hinger.* Wien. klin. Wchnschr., 1922, 35, No. 17, 474-475.—The slight clouding of the lens had the sunflower form, grayish color and transparency typical of the copper injuries previously described. There was no direct damage to the lens, and presence of the foreign body within the eye was established. The fragment was not removed and therefore could not be analyzed, but the history of the case, its typical picture, and the fact that it remained inert in a powerful magnetic field indicate that the material was copper.—B. Cohen.

An Occupational Argyrosis of Both Corneas. *Subal.* Wien. klin. Wchnschr., 1922, 35, No. 21, 493.—A patient, 65 years of age, acquired argyrosis of both corneas from brushing silver with a mixture of oil and pumice. The connective tissues of the lower halves of both eyeballs showed a mouse-gray silver impregnation. The corneas, to the deepest layers, were impregnated in the same way. The yellowish tinge observed there suggests that the silver was bound organically.—B. Cohen.

OCCURRENCE AND PREVENTION OF INDUSTRIAL ACCIDENTS

Safety. *H. J. Wilson.* Ann. Rep. Chief Inspect. Factories and Workshops for 1921. Cmd. 1705, 1922, pp. 15-32.—Trade depression is accountable for a reduction in accidents in Great Britain from 138,773 in 1920 to 92,565 in 1921. In the textile trades cleaning machinery in motion is a prolific cause of accident; in all industries "falling bodies" and "persons falling" lead to nearly 40 per cent. of serious cases. Owing to the action of inspectors, the standard of fencing dangerpoints has risen, and some forms of accident, formerly common—as, for instance, those on the tin rollers of ring frames—have practically ceased. Safety committees are slowly spreading and doing good work; at one large mill by efficient organization a loss in 1920 of 4,235 days through accidents was reduced to 1,225.5 days in 1921.

Reference is made to an ingenious device for locking the setting-on rod of cotton mules, and to an air suction feed arrangement for platen printing machines. Accidents on power-presses in metal work were specially investigated; the inquiry shows the large proportion due to personal carelessness either on the part of the operator or, on account of lack of efficient guard, on the part of the employer, and the small proportion of unavoidable accidents. Another inquiry into accidents at bakers' dough machinery showed that makers of such appliances were still satisfied to send them out imperfectly guarded; hence accidents on trough machines remain as numerous and serious as in pre-war days. On the other hand, builders of cranes are found to be fully alive to the need for sending out cranes fitted with the newest safety devices, so that now only an old and primitive plant gives trouble. The same thing applies to hoists, of which unfortunately many antiquated specimens exist.—E. L. Collis.

Industrial Accident Reporting. *Charles H. Verrill.* Am. Labor Legis. Rev., March, 1922, 12, No. 1, 67-68.—"It may be stated without hesitation that except where a workmen's compensation law is applicable, complete accident reports cannot be secured and should not be expected." Experience has shown that employees oftentimes will not make a report of an accident, or the employer does not make a record of an accident reported unless the injury seems to be immediately serious or unless there is some financial motive. Failure of laws requiring accident reporting, which existed before the enactment of workmen's compensation statutes, the incompleteness of the reporting of short-time accidents causing disability for which no com-

pensation is payable, and the failure of laws respecting reporting of occupational diseases show what is to be expected. Even where workmen's compensation laws have been enacted, accidents may not be reported for several reasons: Many industries are not covered by the compensation law; many states exclude from the compensation law employers with less than a specified number of employees; short-time accidents are not covered by the law in most states—a provision which greatly restricts the number subject to compensation.

"This absence of accident reporting is particularly unfortunate in that it limits accident prevention work by withholding knowledge of the location, nature and extent of accident hazards."—G. E. Partridge.

METAL-MINE ACCIDENTS IN THE UNITED STATES DURING THE CALENDAR YEAR 1920. *William W. Adams.* U. S. Bur. Mines, Tech. Paper 299, 1922, pp. 99.—This pamphlet is a compilation of the accident statistics for all metal mines in the United States during 1920, showing causes and distribution of accidents. —M. C. Hamblet.

QUARRY ACCIDENTS IN THE UNITED STATES DURING THE CALENDAR YEAR 1920. *William W. Adams.* U. S. Bur. Mines, Tech. Paper 295, 1922, pp. 66.—This pamphlet has been compiled from reports received directly from operators of quarries, and represents all processes of the quarrying industry. The statistics are thoroughly representative, although perhaps not complete for the entire industry. Special tables are presented to show accident rates at quarries producing stone, and at those producing crushed stone. Special tables also show the causes of accidents attributed generally to the use of explosives, haulage equipment and machinery.—M. C. Hamblet.

INDUSTRIAL SURGERY

CORRECTIVE MEASURES IN DISABILITIES OF THE BACK. *W. B. Fisk.* Nation's Health, May 15, 1922, 4, No. 5, 297-299.—In seven of the eleven patients, whose case reports Dr. Fisk presents, the pain was localized about the left sacro-iliac joint; in three, about the right sacro-iliac; and in one, over the fifth lumbar vertebra. Two of the patients had pain for several months before deformity was noticed.

The treatment which was applied "consisted in complete relaxation under anesthesia, and with the patient lying on his back with shoulders fixed a slow, strong pull is made on the legs. The pull is steady, and is equal to a lift of seventy-five to one hundred pounds. In making the pull, the ankles are grasped by the operator. I usually place one foot against the table in order to exert a strong pull. I then turn the patient on his abdomen and with my helper working on the opposite side, I thrust my arm under the knee of the patient, with the forearm hooked over the lower part of the thigh. My other hand rests on the sacro-iliac joint. The patient's thigh is then drawn downward and at the same time is over-extended on the body while the sacro-iliac joint is pressed forward.

"I never use fixation appliances of any kind after the stretching operation."

"The deformity and pain in the back have been corrected in ten out of the eleven patients worked on. In six . . . the patient after a disability of from a few weeks to four months has returned to work within a week after the stretching, and has continued at work without interruption. In three cases the pain and deformity in the back were corrected by the stretching, but some discomfort over the outer part of the calf and sole of the foot persisted. In one case the pain and deformity were relieved by the stretching. This patient returned and continued at work for six months, when the deformity recurred.

"In one chronic case where there was no perceptible deformity, the stretching proved of little value. This was in reality a test case. I was desirous of knowing if the stretching process would prove of value in cases where there was no deformity."—M. C. Shorley.

LESIONS OF NERVES IN ARMS. *H. Abrahamsen.* Abstracted as follows from Ugesk. f. Laeger, March 30, 1922, 84, No. 13, 295, in Jour. Am. Med. Assn., May 20, 1922, 78, No. 20, 1582.—"Abrahamsen says that cutting wounds were responsible for the injury in thirty-seven of his fifty-two cases of lesions of the nerves in the arm. This is the most frequent cause of paralysis of the arm in

adults, an open cut from a knife or piece of glass. Fractures seldom induce paralysis. In children, subcutaneous injuries are more common, and secondary paralysis is frequent. This may be due to the lesser resistance of the youthful nerves or to the extreme dislocation of the fragments which is common, but over-exuberant callus is the most frequent cause of nervous disturbance in children. It is necessary therefore to distinguish between lesions in children and in adults. He emphasizes the importance in all injuries of the arm near the trunk nerves of making a thorough examination before the operation, before conditions are modified by the anesthetic. Too often the injury to the nerve is overlooked until after the incision has been sutured. The end-bulbs have to be resected before the nerve can regenerate. In only nine of the thirty-seven cutting wounds had the nerve been sutured primarily, while in all the others (75 per cent.) the injury of the nerve had not been discovered until local anesthesia, chilliness, cyanosis, advanced atrophy or contracture had called attention to the fact that the nerve had been injured. The functional damage resulting from this oversight of the nerve lesion is often serious for handicraftsmen, as he shows by several examples, the disability compensation amounting finally to 20, 30 or 40 per cent.''—C. K. Drinker.

INDUSTRIAL PHYSIOLOGY: NUTRITION, METABOLISM, FATIGUE, ETC.

Alcohol and Industrial Efficiency. *H.M. Vernon.* Brit. Jour. Inebriety, 1921, 18. 109-123.—(*Review by author.*) The effect of alcohol upon manual dexterity is very greatly influenced by the time at which it is taken, in relation to meals. Experiments were made systematically in which a whiskey mixture containing 45 c.c. of ethyl alcohol was taken directly after a substantial meal, or from one to twenty hours afterwards. The influence on speed and accuracy of typewriting was measured, and the deleterious effect of the alcohol taken directly after food amounted to 1.7 per cent., while it was 2.5 and 2.9 per cent. when taken respectively one and two hours after eating. When taken three and one-half hours after a meal, the effect was 7.6 per cent., or more than twice as great as before, owing to the fact that the stomach was practically empty of food. After intervals of thirteen and twenty hours the effect rose to 9.8 and 10.2 per cent. Fatigue increased the effects produced, for a two-hour bicycle ride at the end of a thirteen hours' fast increased the typing mistakes made to 19 per cent. more than those made in the corresponding resting experiments.

The effects produced by 30 c.c. of alcohol disappeared in about two and one-half hours, and those produced by 45 c.c. and 60 c.c. in three and one-half hours and four and one-half hours, respectively. These results indicate that alcohol was being oxidized in the body (body-weight 76 kg.) at the rate of about 13 c.c. per hour.

Health Problems Involved in Noise and Fatigue. *Henry J. Spooner.* Nation's Health, Feb. 15, 1922, 4, No. 2, 91-95.—Apart from muscular fatigue, the output of a worker is primarily affected by the quality of the air in which he works, the efficiency of the lighting arrangements, and the amount of noise in his vicinity. Although fatigue resulting from noise attacks primarily the ear, it little by little extends to the whole nervous system, in some cases causing even greater weariness than that due to muscular fatigue. Medical authorities are agreed that noise is injurious to health, and is an undoubted source of fatigue and nerve strain, due chiefly to its influence upon the faculty of attention. Noise is also the greatest enemy of sleep.

The author gives a brief description of the ear, makes some remarks upon hearing and deafness, and draws attention to the fact that men working together instinctively tend to work rhythmically. Some of the best known ear protectors are described; certain truths regarding the origin and propagation of sound are considered; and finally the primary kinds of noise that demand attention are classified.—L. A. Shaw.

WOMEN AND CHILDREN IN INDUSTRY

SHORTCOMINGS IN CHILD PROTECTION. *Ethel M. Johnson.* Am. Child, May, 1922, 4, No. 1, 49-52.—There are many conditions of child life in Massachusetts still in need of correction. There is a high accident rate among working children, and young children are at work in the agricultural fields. Massachusetts is falling behind some of the more progressive states with regard to educational standards. Within a year or two continuation schools have been established for children 14 to 16 years of age; whereas in several states continuation school attendance is required of all working children up to the age of 18 years, and for eight hours a week, as compared with the four-hour minimum in Massachusetts. Of children under 16 who go to work, nearly nine-tenths enter occupations that have little or no educational value. Job shifting is very frequent among the younger workers.

Efforts are made to safeguard children entering industry by requiring them to meet certain minimum standards as to age, education, and physical fitness. There are restrictions upon the processes and occupations at which young persons may work. But there are practical difficulties and limitations in extending this protection. The examination for physical fitness may be superficial or may be omitted entirely; and as this work is now performed few children are excluded from industry because of defects. It is difficult to confine children to the safe areas in industry, partly on account of the ease with which a worker may be changed from one kind of work to another, and partly because of the natural tendency of children to be careless and to disregard rules. Children are tempted to try to operate machinery to which they are not assigned, and the fault is therefore the child's, but indirectly the fault rests with the society that permits children to be in industry at an immature age.—G. E. Partridge.

INTERNATIONAL CHILD LABOR LEGISLATION. *Raymond G. Fuller.* Am. Child, May, 1922, 4, No. 1, 34-38.—The draft conventions of the third general conference of the International Labor Organization of the League of Nations, which was held at Geneva last fall, contain several articles affecting the labor of children. It is provided that children under the age of 14 may not be employed in any public or private agricultural undertaking except outside the hours of school attendance; and that for the purposes of practical vocational instruction the periods of the hours of school attendance may be so arranged as to permit the employment of children on light agricultural work, provided that such work shall not reduce the total amount of school attendance to less than eight months a year.

Several recommendations were made: that every member of the organization try to develop vocational agricultural education; that steps be taken to regulate the employment of children under the age of 14 at night work in order to give not less than ten consecutive hours of rest; and of young persons from 14 to 18 so as to provide not less than nine consecutive hours. Measures to protect women wage earners employed in agriculture were advised. A draft convention was adopted fixing the minimum age for the admission of young persons to employment as trimmers or stokers on vessels at 18 years (with certain exceptions). Another convention provides that the employment of young persons under 18 on any vessels other than those upon which only members of the same family are employed shall be conditional on the possession of a proper medical certificate.

British Columbia, Belgium, Czecho-Slovakia, Great Britain, Greece and Roumania have accepted the draft convention fixing the minimum age of admission to industrial employment. The Washington convention relating to night work of young persons has been adopted by British Columbia, Belgium, Denmark, Great Britain, Greece, and Roumania. Great Britain, Germany, Italy, and Sweden have passed measures ratifying or giving effect to the Genoa draft convention fixing the minimum age for admission of children to employment at sea.

"It should be noted that although the first International Labor Conference was held in Washington and the International Labor Office has an American correspondent, the United States is not a member of the League of Nations and therefore, of course, does not participate in the affairs of the International Labor Organization as a member nation."—G. E. Partridge.

INDUSTRIAL SANITATION: FACTORY CONSTRUCTION, ILLUMINATION, VENTILATION, HEATING, WATER SUPPLY, SEWAGE DISPOSAL

HEALTH AND SANITATION. *E. A. R. Werner.* Ann. Rep. Chief Inspect. Factories and Workshops for 1921. Cmd. 1705, 1922, pp. 55-61.—Mr. Werner summarizes the situation in British factories in relation to cleanliness, ventilation, temperature, illumination, and dust removal. Slackness of trade is giving opportunity for cleaning and limewashing—an economy with regard to illumination; a novel and easily cleaned floor is referred to, composed of concrete as a foundation for machines, and asphalt for passages and alleyways; lack of cleanliness in food factories, particularly in bakehouses, is criticized and the need for exterminating flies is stressed. Bakers seem adverse to cleaning by water which cools the atmosphere and consequently checks fermentation, but there is no reason why properly constructed floors should not be frequently scraped. Progress is reported in the installation of enclosed apparatus—conveyors and elevators—for suppressing dust, and of localized exhaust ventilation for its removal. The substitution of manufactured abrasive wheels (containing little or no free silica) for ordinary sandstone wheels is welcomed as minimizing the dust danger. In the textile industries dust removal in the opening processes and in carding continues to be improved, and the devices used are being extended to many other industries. Attention to general ventilation lags behind, owing to lack of appreciation of the need and of expert knowledge as to means to adopt it. Temperature is better understood; means for cooling men at unduly hot work by air douches, and better provision for warming chilly workrooms are reported; more enlightened views are gaining ground. On the other hand, surprisingly little attention is directed to illumination, having regard to its undoubted economic value; obsolete batswing gas burners still prevail, and in many fustian-cutting works the operatives still have to provide their own candles.—E. L. Collis.

LABOR CAMP SANITATION IN CALIFORNIA. *R. Justin Miller.* Nation's Health, Feb. 15, 1922, 4, No. 2, 96-101.—The Camp Act in California lays down certain rules and regulations which must be observed by the operators of workingmen's camps in that state in order to insure proper sanitation and a reasonable healthful environment for the workers. The law calls for suitable bunks or beds with an adequate supply of fresh air for each person; certain regulations must be observed with regard to the food and the manner in which it is cooked and served; bathing facilities, toilet construction, drainage, and sewage must conform to very definite specifications.

The enforcement of this act is in the hands of the Commission of Immigration and Housing of California. Inspectors are sent out by the Commission and assigned to definite sections, checking up the conditions which they find. Their reports are sent to the main office and instructions are despatched to the camp operators informing them of necessary changes to be made. The system has proved a great success.—L. A. Shaw.

UNDERGROUND WORKROOMS. *H. Martindale.* Ann. Rep. Chief Inspect. Factories and Workshops for 1921. Cmd. 1705, 1922, pp. 95-107.—This article summarizes the conditions found in London in three hundred underground workrooms of all sorts and kinds in which a great variety of trades were being carried on. The more modern premises were of semi-basement type with ceilings above the street level; but the older ones, never intended for use as workrooms, presented structural conditions impossible for good lighting, ventilation, and general hygiene. In some instances the only provision for ventilation consisted in holes pierced in pavement lights; in other cases fire flues carried off foul air fairly efficiently; while in 7 per cent. mechanically driven exhaust or inlet fans were installed. In some cases air movement only was effected by open fans; but in only 19 per cent. of the premises visited was through ventilation impossible. The state of the air, as determined by carbon dioxide content and by kata-thermometer observations, although far from ideal, was found less unsatisfactory than might have been anticipated.

Lighting during daylight hours was not good, and in 78 per cent. of the rooms natural light was insufficient and required at all times to be supplemented by artificial illumination; in several cases practically no natural light whatever entered the rooms. Electric light was the usual illuminant; but too often unshaded lamps were in use instead of indirect general lighting, and glare resulted. Obstruction of windows by machinery and packing cases, and lack of attention to cleaning, reduced the natural light in the majority of rooms.

Heating appliances were quite haphazard, and frequently a heat-producing plant was relied upon for warmth.

The general conclusions drawn from this comprehensive inquiry, which establishes a standard for present-day conditions of work, are that on the whole the standard maintained is better than might have been anticipated and far higher than existed in such unsuitable premises a few decades ago.—E. L. Collis.

LIGHTING THE FACTORY. *S. G. Hibben.* Factory, May, 1922, 28, No. 5, 523-526.—Outdoor illumination is many times greater than even the highest estimates of what constitutes good artificial lighting indoors. Within a building natural illumination varies greatly from place to place. The result is that there are inequalities in light subject to recognizable laws which the illuminating engineer must take into account. Lighting problems are complicated by the position of buildings and their direction of exposure, etc. Distribution of light may be effected by the use of curtains and by proper employment of prism window glass. The study of daylight involves also a study of color, since natural light is very changeable in its hues. Finally, the cost of artificial lighting as related to the cost of construction and maintenace of the means of utilization of natural light must be taken into consideration.

The present paper touches only briefly upon the phases of illumination that are presented, but there are several useful charts showing the intensity of daylight at different periods of the year and hours of the day; the lighting values at sunset; effect, with regard to interior daylight illumination, of the orientation of the illuminated spaces; comparative brilliancies of various illuminating means; transmission through sheet glass; and radiant energy of lights of different colors. —G. E. Partridge.

RESEARCH WORK THAT SOLVED THE PROBLEM OF VENTILATING THE HUDSON RIVER TUNNEL. *Robert G. Skerrett.* Reprinted from Compressed Air Mag., April, 1922, in Heating and Ventilating Mag., May, 1922, 19, No. 5, 29-35.—This is a review of the research on the engineering and physiological aspects of ventilating the Hudson River vehicular tunnel. Interested readers are referred to the article by Henderson and others, entitled "The Physiological Effects of Automobile Exhaust Gas and Standards of Ventilation for Brief Exposures," which appeared in THIS JOURNAL. 1921-1922, *3*, 79, 137.—Philip Drinker.

DETERMINATION OF THE RELATIVE COMFORT OF MINE WORKING PLACES BY MEANS OF THE KATA-THERMOMETER. *D. Harrington* and *G. E. McElroy.* U. S. Bur. Mines, Rep. Investigations, Ser. No. 2355, May, 1922, pp. 7.—Some data have been collected by the United States Bureau of Mines and the United States Public Health Service relating to the adaptability of the kata-thermometer for determining the comfort of working places in mines. The kata-thermometer is an instrument devised by Dr. Leonard Hill, an eminent English physiologist, for the purpose of measuring the rate of cooling of the human body. It measures its own rate of cooling when its temperature approximates that of the human body, and so measures comfort which, in Hill's opinion, is controlled by the rate of cooling. The instrument does not measure other vital elements such as chemical impurity and the presence of various kinds and quantities of dust, but the substitution of "kata" cooling powers for the wet-bulb air temperature is an advance. Recently there has been put on the market an electric kata-thermometer, by which dry cooling powers may be read directly.

Comfort felt in air having particular cooling values depends in part on the individual and his physical condition and upon the kind and amount of clothing worn, but it is possible to show the relation of definite limits of cooling power to degrees of comfort. The

cooling power of air has a direct relation to a worker's efficiency. For this reason, one of the important problems in the metal-mining industry of this country is to provide such air conditions at working faces as will permit the miners to work comfortably, efficiently and without straining the heat-regulating mechanisms of the body by excessive perspiration. Factors of temperature and humidity are difficult to control, but air movement, the most important factor in producing cooling power of the air, is controllable. At the present time the conditions in regard to this factor are poor; air-movement, even in the better ventilated so-called hot mines, is almost wanting at most working faces, especially in development ends, and the same is true of too many fan-pipe ventilated development ends. Better conditions for the comfort of mine working places in our metal mines can be effected by more attention to providing air motion at the working faces.

The paper contains two useful tables: Table 1 shows the relation between cooling power of the air and comfort; Table 2 presents data in regard to six typical mines with reference to measurements by the kata-thermometer.—G. E. Partridge.

INDUSTRIAL MEDICAL SERVICE: MEDICAL DISPENSARIES AND HOSPITALS IN INDUSTRIAL PLANTS

FIRST AID. *S. D. Hubbard.* New York Med. Jour., Jan. 4, 1922, 115, No. 1, 36-39.—Industrial hygiene comprises many functions which may be included in the following twelve groups: (1) prevention of accidents in industrial establishments and application of the principle of safety first; (2) prevention of disease in industrial establishments (including communicable diseases, diseases of degeneration, and the special diseases of occupation); (3) elimination of nuisances (referring to disposal of garbage, waste, fumes, dust, and smoke); (4) maintenance of heating, lighting, ventilating, etc.; (5) providing and serving suitable food, and inculcating proper diet habits; (6) installation and management of dispensary and hospital service; (7) keeping statistics of accidents, diseases, absences, and facts regarding new employment and dismissals, and making special reports and suggestions for improvement of the service; (8) supervision of fire prevention, fire drills, first-aid instruction, inspection for safety, teaching the special hazards of an establishment, prevention of dangers of such incidence; (9) education in personal hygiene and sanitation in the shop, the home, and the community; (10) special research such as may be necessary to prevent accidents, preserve health, increase efficiency, and improve safety; (11) supervision of clothing and selection of glasses; (12) efforts to discover the causes of fatigue, and to determine its presence; provision for games, rest rooms, physical training, locker room, and cleaning facilities.

First aid is not instinctive, but is an acquirement and should be taught to all employees. Bulletins, literature, talks, motion pictures and other methods should be employed in facilitating its dissemination. The co-operation of all must be gained, and the appreciation and assistance of everyone in the plant are needed. "First-aid instruction and installation must therefore be done so intelligently and humanely as to make all appreciate the danger of accidents and the necessity of keeping them down to the lowest number possible. . . . . First aid is something more than simply opening a small office and caring for the injured."—G. E. Partridge.

PREVENTION WORK IS EMPHASIZED. *C. W. Geiger.* Hosp. Management, April, 1922, 13, No. 4, 56.—As part of a personnel program, the Paraffin Companies, Inc., of San Francisco have installed complete medical service. Physical examinations of the employees are being made in order to protect their health. Dismissal does not follow discovery of ill health, but an effort is made to place an affected person in a position where his work will be favorable. First aid is taught to all employees in the plant, and it is of the greatest possible service in preventing sickness.—G. E. Partridge.

RECORDS OF THE SMALL SICK-BENEFIT ASSOCIATION AS A SOURCE OF STATISTICS FOR THE FACTORY MEDICAL DEPARTMENT. *D. K. Brundage.* U. S. Pub. Health Ser., Pub. Health

Rep., Feb. 24, 1922, 37, No. 8, 413-422.—Useful information has been acquired, pointing out the advantages of employee sick-benefit association records. One association, consisting of employees of four manufacturing plants, gives the number of days lost from sickness and non-industrial accidents for five days or longer, during 1920, as 4.68 per employee. This high ill-health rate shows the need for action for correcting whatever conditions there are either wholly or partially responsible for the disability.—M. C. Hamblet.

Health Problems Affecting Industry. *W. F. Dearden.* Welfare Work, March, 1922, 3, No. 22.—The author presents a short account of the work of Ramazzini in industrial medicine, illustrating the importance attached to the subject in European countries at the beginning of the eighteenth century. He also describes the development of the medical side of the Factory Act and its administration. Both general mortality figures and mortality figures for specified diseases are quoted in order to establish the fact that, in certain trades, "the excessive amount of disability and loss of life from sickness among those engaged in industrial occupations is appalling, and can only be accounted for (*i. e.*, the excess) by the association of deleterious conditions with the industries themselves."

Reorganization, with certain modifications, of medical work in factories according to the plan of the Belgian Factory Medical Department is advocated. —E. Hewitt.

Selling Better Health to National Cash Register Employees. *F. G. Barr.* Nat. Safety News, June, 1922, 5, No. 6, 17-19.—The account by Dr. Barr of the National Cash Register Company hardly gives sufficient emphasis to the remarkable results of the health work done under his direction. The average time lost by industrial workers on account of sickness is variously estimated at from six to nine days annually per employee. In the National Cash Register Company the figure is now 11.5 hours. Industrial executives recognize that a company loses heavily when production is interrupted through the sickness of employees. The same methods of prevention used so effectively by Dr. Barr can be used by any other company.

"Selling" Industrial Hospital Service. Hosp. Management, March, 1922, 13, No. 3, 56-57.—The writer emphasizes the importance of publicity in connection with the hospital work of industrial plants. The case reported is of a large increase in the number of employees treated after the beginning of the publication of a bulletin. In 1915, the year before the publicity work was started, the number of cases treated at the hospital, involving no loss of time, was 651, but in the following year there were 1,383 treatments. There were 193 days lost through injuries in 1921, compared with 906 days in 1911, the first year of the hospital. The change has been brought about by persistent advertising of the hospital service.—G. E. Partridge.

What a Dental Clinic Can Do in Your Factory. *L. G. Grace.* Factory, April, 1922, 28, No. 4, 405-407.—Industrial organizations are fast beginning to realize that the dental dispensary is an important factor in increasing the amount of work an employee can do in one day. In one factory the dental work has saved the employees 2,000 hours in the past six months. The work is of two kinds: emergency and preventive. Men with aching teeth will have the pain stopped, but many employees do not realize the serious effects resulting from lack of care of the teeth.

The Metropolitan Life Insurance Company, which has made a thorough study of health conditions in their relation to mental and physical efficiency, has maintained a dental clinic since 1915. The improvement in health of employees has been so marked that, as a result, a rule has been made that every home-office employee must undergo an examination and a cleansing of the teeth twice a year. Other instances are given showing the advantages of dental clinics both to employer and employee.—M. C. Hamblet.

INDUSTRIAL PERSONAL AND COMMUNITY HYGIENE: HOUSING, ETC.

Health in Industry and Its Relation to the Community. *J. G. Cunningham.* Pub. Health Jour., March, 1922, 13, No. 3, 114-117. —This is a very general survey of the subject

of public health, touching upon the development of public health service from its original narrow limit of preventive work. The scope of industrial hygiene is considered; also the problem of infant mortality as related to the employment of women; the problem of "industrial birth"—that is, the change of the school child into the industrial worker; the industrial medical service; part-time medical supervision. The advantages and disadvantages of co-operative effort on the part of small industrial establishments in supplying health service essential in industry are discussed.—G. E. Partridge.

HOUSING. THE CREDIT BUREAU FOR INDUSTRIAL HOUSING. Abstracted as follows from L'Usine, Paris, April 1, 1922, in Factory, June, 1922, 28, No. 6, 651.—"The action of this bureau, which was created by the association of metallurgical industries, constitutes in many respects a happy solution of the industrial housing question in France.

"This organization's object is, while furnishing to manufacturers the necessary capital for workmen's houses—money which the Government would not and cannot furnish—to make of employee housing not a work of charity but a remunerative enterprise for the invested capital, represented by securities negotiable on the Bourse and having solid guaranties. This point of view has been lacking until now.

"After an agreement with large financial houses which have accepted the commission of placing the securities issued, the bureau lends the capital thus raised for periods ranging from twenty to thirty years to the building societies of industrial organizations interested. The heads of the industrial enterprise are always called upon to guarantee personally the loans made, and this eliminates the costly mortgages which the bureau does away with to keep the cost low. House plans must be submitted to the bureau, and all plans must be satisfactory from the point of view of health and sanitation.

"Large families are favored by adequate houses set aside at lower rents than are charged for families without children. Gardens are provided; and since the proprietor is not the head of the manufacturing plant, but a separate organization, difficulty between employee and employer cannot occur as a result of their relation of tenant and landlord.

"The capital, starting at 5,000,000 francs, has grown to 100,000,000 francs. . . .

"One result has been the development of standardized types. Manufacturers who have guaranteed reduced prices on construction materials in lots have been given credit to enable them to undertake quantity manufacturing of these materials. This has been extended to the mill work, sanitary supplies, glass, paints, roofing, heating, and other supplies, and it is estimated that several million francs have been economized in this manner."

GOVERNMENT AID FOR THE BUILDING OF WORKMEN'S HOUSES IN SPAIN. U. S. Bur. Labor Statis., Month. Labor Rev., May, 1922, 14, No. 5, 166-167.—To alleviate conditions arising from the housing shortage in Spain, a royal decree was issued in 1921, providing for government aid to societies formed for the purpose of building workmen's homes.

According to this decree, the state, province, or municipality may rent, sell, or give away any of its land as a site for workmen's houses, and city councils may purchase land for this purpose. To encourage building operations, many forms of government taxes—taxes on building construction, the purchase of land, contracts, bond issues, formation of companies, etc.—are waived for a period of twenty years from the date of completion of a building. In special cases materials for building workmen's homes may be exempt from customs duties. Government loans with a thirty-year limit may be made, yielding 3 per cent. or even as little as 2 per cent. The maximum loan is limited to 55 per cent. of the value of the land and 70 per cent. of the value of the completed houses.

The government may grant subsidies amounting to 25 per cent. of the value of land and buildings, and one of 50 per cent. if, in cities where the housing problem is very acute, workmen's houses are completed within a year of the publication of this decree.

The royal decree of 1921 also deals with the legal status, rent, interest and security for loans, inspection and sanitation of "cheap" houses, etc. The provisions of the decree are to be administered by the Ministry of Labor through the Institute of Social Reform. The local administration is in the hands of a council on cheap houses in every municipality concerned.—M. C. Hamblet.

INDUSTRIAL INVESTIGATIONS AND SURVEYS

An Investigation into the Packing of Chocolates (2). *B. Muscio* and *R. St. C. Brooke*. Journal Nat. Inst. Indust. Psychol., 1922, 1, 68-75.—The authors describe the effects of training five inefficient girls in the principles of chocolate packing. These principles consisted in the systematic arrangement of materials in such a way as to reduce to a minimum the range and number of a worker's movements, and in instructing her to work with both hands in a rhythmical, easy manner. After four or five weeks' training by a skilled packer, who was chosen as instructor, the efficiency of the girls showed an average increase of 27 per cent.

Subsequently, twelve novices, of average general ability, were trained for seven weeks, and it was found that their speed of packing was nearly 27 per cent. greater than that of other novices who, in accordance with the usual custom, had received no systematic training.

The authors point out that skilled workers are by no means always good instructors. Their movements are usually too rapid to follow, and as they are semi-automatic the workers themselves may not know of what they consist.—H. M. Vernon.

A Survey and Analysis of the Pottery Industry. Fed. Board for Vocational Education, Trade and Indust. Series No. 20, Bull. No. 67, pp. 86.—The writer first indicates briefly his procedure and makes some pertinent suggestions about the uses of such a bulletin as he has prepared—by the employer to gain a "bird's eye view" of his industry; by the foreman as a handbook in giving instruction; by the workman as a description of his job in its relations to the industry as a whole; by the director of vocational training, etc.

The main part of the report is a study in job analysis. The different departments of the pottery industry are taken in turn, and data are given in regard to possibilities for training, lines of promotion, qualifications necessary, including skill, education, physical qualities, age, etc. The jobs are then considered again with reference to such topics as trade terms, stock, care of tools and equipment, safety, and requirements in regard to mathematics, science, and drawing.

The art work of pottery is treated separately by a similar procedure, and the report includes a sketch of the general trade science relating to the industry.—G. E. Partridge.

INDUSTRIAL HEALTH LEGISLATION: COURT DECISIONS: WORKMEN'S COMPENSATION AND INSURANCE

Health Legislation in Belgium. Survey, March 11, 1922.—There is an important new anti-tuberculosis act in Belgium, making state support available to private organizations. A new national association has been formed which is entitled to a grant of several million francs. Large sums have been given from the first grant to a co-operative organization for the establishment of sanatoria. Dr. Glibert, director of the Bureau of Hygiene in the Department of Labor, is enthusiastic over the prospect, as he sees it, of making Belgium the model country in the prevention of the white plague.

Dr. Glibert has been giving attention, also, to the drafting of a law for insurance against industrial diseases not covered by the present sickness insurance. Under the latter, compensation of one-half salary is allowed, but Dr. Glibert thinks that the responsibility of the industry in the case of lead poisoning, anthrax and similar definitely industrial diseases should be greater, perhaps to the extent of compensation to the full amount of the normal earnings. Under this bill, the principal contributions will fall on employers, with smaller grants from state and province. It does not provide for reinsurance of employers, but for contributions large enough to make a reserve fund.

There are plans for providing state supervision over the health of juvenile workers. The department already has power to issue certificates to apprentices from 14 to 18 years of age, and a royal decree has been issued to the effect that all such apprentices must be medically inspected at least once a year. There is gradually being organized a coördinated system of state supervision in the form of medical inspection for schools, military serv-

ice, apprenticeship, and certain state and municipal institutions. A further extension of the principle is advocated for the protection, by medical care, of expectant mothers in industry. Obligatory provision of first-aid equipment in factories has recently been enacted.—G. E. Partridge.

Regulations: Lead Compounds. Internat. Labour Office, Legis. Series, Great Britain, No. 6, 1921.—This pamphlet gives regulations for the manufacture of certain compounds of lead in Great Britain under the two headings: (1) duties of occupiers, and (2) duties of persons employed.

Act Providing for Erection of Washrooms for Employees Held Invalid. U. S. Pub. Health Ser., Pub. Health Rep., April 8, 1922, 37, No. 17, 1021.—Section 1 of Chapter 20 of the 1920 acts of Kentucky required certain employers to provide and maintain washrooms when 30 per cent. of the employees had voted to notify the employer to erect such a washroom. This act has been declared unconstitutional by the Court of Appeals of Kentucky on the ground of its being a delegation of legislative power in violation of Section 60 of the state constitution.—B. Cohen.

Hours of Work in German Industry. Abstracted in Internat. Labour Rev., May, 1922, 5, No. 5, 784-798, from Report of Netherlands Commission of Enquiry into Hours of Work in German Industry.—The German order limits the working day in all industrial establishments to eight hours. No weekly limit is fixed, but since 1895 Sunday work has been prohibited for workers in industrial establishments, with certain specific exceptions. No provision is made for a Saturday half-holiday, but it has been generally adopted by agreement. Night work for adult men is not prohibited, but work between 8 p. m. and 6 a. m. is prohibited for women and for persons under 16 years of age. The use of the two or three shift system is not restricted in the case of adult workers. Authorization for overtime work is often granted, especially when foreign orders are involved, and when conditions necessitate it.

The report deals with administrative provisions, and with hours of work in the following industries: glass and pottery, printing and book trades, chemical industry, wood working industry, clothing, leather, metal working, textiles, beet sugar industry, and bakeries.—G. E. Partridge.

Decisions of Courts and Opinions Affecting Labor. 1919-1920. *Lindley D. Clark* and *Martin C. Frincke, Jr.* U. S. Bur. Labor Statis., Bull. No. 290, Jan., 1922.—This bulletin is the eighth of a series devoted exclusively to the presentation of court decisions. No attempt is made to cover the entire list of decisions handed down by the state and federal courts, but representative types have been selected.—M. C. Hamblet.

Some Remarks Concerning Compensation for Ocular Injuries. *F. Allport.* Med. Record, March 18, 1922, 101, No. 11, 446-451.—State industrial commissions have demonstrated their own usefulness, but it is contended that they should be chosen with reference to avoiding partisanship, and should not predominantly include men in either the employer or employee class.

The medical expert meets a number of difficulties in his relations with these industrial boards. Verdicts are often given in contradiction to plain medical evidence, as in cases in which compensation is claimed for troubles that could not have arisen from an injury, and in cases in which malingering is demonstrated. There is a law concerning visual losses that is most unfair and illogical to all parties concerned—that is, if a man who is already blind in one eye loses the other eye while in employment, the employer is liable for the loss of both eyes. The man with but one eye is a greater risk, and consequently many men are debarred from desirable occupation because unjust responsibilities are forced upon employers.

The subject of traumatic cataract raises other questions. Industrial commissions as a rule insist upon estimating vision in such cases without glasses, the result being that since the employer gets no credit for the results of a successful operation by which the vision may be practically restored, he is tempted to discontinue the treatment without providing for a desirable operation. The alternative would be for industrial commissions and legislatures to allow an employer some reasonable financial consideration if he undertakes the expense of a cataract operation.

Another point to be insisted upon is that employers and applicants demand examination of eyes and ears before employment.

It must be the experience of all surgeons doing any amount of industrial surgery that many employees endeavor to represent that old pathological conditions have never existed until some recent accident has occurred. Old necrotic conditions and senile cataracts are charged to such injuries.

One obstacle to just and intelligent settlement is an absurd but natural interpretation of Snellen's test types. Testimony is often given that 20/40 indicates a half loss of vision. The writer offers a new table which eliminates the possibility of wrong conclusions being drawn by regarding the Snellen fractions as indicative of visual conditions and which also overcomes some of the practical deficiencies of the scale accepted by the Chicago Ophthalmological Society in 1919, which has discrepancies in percentages, making its general adoption difficult to attain. The new scale is as follows:

20/20	indicates	no	loss	of	vision.
20/30	"	5%	"	"	"
20/40	"	10	"	"	"
20/50	"	15	"	"	"
20/190	"	85	"	"	"
20/200	"	90	"	"	"
20/210	"	95	"	"	"
20/220	"	100	"	"	"

—G. E. Partridge.

Rating Losses of Industrial Vision Under the New York State Compensation Law. *W. Mehl.* Med. Record, Jan. 28, 1922, 101, No. 4, 145-148.—Permanent disability compensation bears no direct relation to the damage done to the earning ability of an injured person, but attempts to provide for average industrial justice. The law of New York state, for example, takes no account of the actual economic losses in compensating for permanent disability in eyesight caused by industrial injury.

The function of the examining medical expert ought to end with an exact estimate of the injury sustained. In other fields the surgeon is not usually requested to interpret his results with reference to the compensation law as he is frequently requested to do in regard to injuries involving impairment of eyesight.

Ordinarily loss of vision may be determined by the Snellen tests, even though they apply only to central vision. The law now provides that a loss of 80 per cent. of vision is to be regarded as loss of use of an eye. This means that vision is 20/100 of normal, and the Snellen test has been accepted as a means of measurement. In regard to vision between normal and 20/100, 20/40 means that working vision has been reduced to one-half normal. Looking at the matter from the standpoint of industrial efficiency, it may be conceded that 20/40 represents less than 50 per cent. impairment of vision. By accepting 20/100 as 100 per cent. loss, and dividing the interval, 20/60 is found to be 50 per cent. loss of vision, and the percentages of reduction for other measurements are proportionate.—G. E. Partridge.

Japanese Health Insurance Law. U. S. Dept. Labor, Month. Labor Rev., July, 1922, 15, No. 1, 164.—"A special report from the acting commercial attaché at Tokyo, Japan, summarizes the provisions of a health insurance law recently passed by the Japanese Diet. The text of the law consists of 91 articles but in brief it provides that employees in factories of every description, both official and private establishments, shall carry health insurance if their annual income is 1,200 yen ($598.20, par) or less. The health insurance law is to be administered by the Government and the insurers are to be the Government and organized health insurance societies. These societies are to be organized by factory proprietors and their employees and one-tenth of the expense of said societies is to be borne by the Government.

"The insurance premium, which must not exceed 3 per cent. of the daily wage of the employee, is paid half by employers and half by the employees. Insurance is paid to employees in case of sickness, accident, death, and childbirth."

Compulsory Health Insurance. A Connecticut Viewpoint. *W. E. Hartshorn.* Med. Record, Jan. 7, 1922, 101, No. 1, 17-18.—The question of compulsory health insurance will probably be one of the important issues considered by several state legislative bodies at their next meeting. The standard bill adopted by the American Association for Labor Legislation provides that all employees earning less than a given amount (ranging from $800 to $1200) shall be entitled to medical, surgical,

hospital, and nursing care, dental treatment, maternity benefits, cash benefits, and funeral expenses. The state is to provide one-fifth of the fund, two-fifths is contributed by the employer, and the remaining two-fifths by the employee in the form of compulsory payments of a certain percentage of his wages, variously estimated from 3 to 7½ per cent. Employees receiving less than $5 per week pay nothing, the employer paying in these cases 80 per cent. and the state 20 per cent.

The brief of the model bill claims: (1) that there is at present a disproportionately large amount of sickness among employed persons causing immediate loss of time and wages amounting to half a billion dollars annually; (2) that the wages paid to American working men are inadequate to enable them to meet the expenses of sickness, etc., and that it is necessary to distribute this burden.

Objections are offered on the ground that statistics in this case are very imperfectly prepared, that as presented the plan is simply a method of taxing the citizens of the state, directly or indirectly, to furnish medical and surgical service to maintain the productive efficiency of part of the population, and that it is essentially a socialistic idea, and not really insurance at all. The American Medical Association and the Federation of Labor have both gone on record as opposed to it.

It has been suggested that each state, where bills are presented, request the legislature to appropriate a sufficient amount of money to enable the state board of health to make a complete and exhaustive survey of the entire state, showing how the existing health organizations may be increased and developed to a point where every citizen of the state, regardless of economic condition or industrial status, may be protected from disease and may enjoy the highest degree of efficiency. Each physician should co-operate in every way with the committee of the state medical society, informing the public and the profession, through a campaign of education, regarding the exact status of compulsory state insurance.—G. E. Partridge.

REHABILITATION OF DISABLED EMPLOYEES

Federal Aid in Industrial Rehabilitation. *Tracy Copp.* Nation's Health, Feb. 15, 1922, 4, No. 2, 59-60.—The federal government is offering to finance jointly with the states a plan to place persons handicapped by disease and accidents, whether incurred while working in an industrial establishment or otherwise, in positions which will afford the maximum happiness and profit to the individuals. It is hoped that through this scheme not only the individuals concerned will benefit, but that society and industry as well will reap a real profit.—L. A. Shaw.

ABSTRACT OF THE LITERATURE
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GENERAL

CONDITIONS IN THE GLASS INDUSTRY. *J. E. Harston.* Ann. Rep. Chief Inspect. Factories and Workshops for 1921. Cmd. 1705, 1922, pp. 108-113.—Glass making, although one of the oldest of British industries, does not today employ more than 50,000 workers. Nevertheless the branches of the industry are almost as varied as the premises and conditions of work; old and dilapidated works and small employers contrast with modern factories with up-to-date machinery and labor-saving appliances. The introduction of red lead, often in a dry state, as a component of the "metal" constitutes a risk which in badly lighted and ill-ventilated rooms leads to plumbism; but the risk is minimized when the mixing is done by power-driven, dust-tight machinery without any handling, or when the red lead is moistened before use.

In recent years the glass house has been the scene of improvements; compressed air is replacing human lungs for blowing; automatic machines are superseding hand labor; and douches of cool air are tempering the discomfort from intense heat. Cataract from exposure to heat rays continues to occur, although compensation claims therefor are not numerous. Taken as a whole, glass making, when carried on under good conditions, cannot be considered dangerous or unhealthy. There is a tendency, especially marked in the bottle trade, for larger works to supplant smaller ones; this tendency is to be welcomed, as it is associated with substantial betterment in general factory conditions.—E. L. Collis.

SOME PRACTICAL EXPERIENCE SLANTS ON THE FIVE-DAY WEEK. Abstracted from Mfg.

Clothier, New York, in Factory, July, 1922, 29, No. 1, 30.—The Joseph and Feiss Company, manufacturers of men's clothing, are the real pioneers of the five-day-week plan. In spite of criticism of the plan, on the ground of its impracticability, it has had great success in plants where the cost of making ready for a day's work cuts heavily into the profits of a four-hour day on Saturday. The four decided advantages to be gained by the five day week are:

First, the saving in power. It is found that the same results are obtained by running the machines on 10 per cent. less time.

Second, the reduction in absence and labor turnover. It is noticed that the employees work more consistently during five days with the prospect of a full week-day to themselves.

Third, new sources of labor supply. The five-day week affords the opportunity for employment to many women who would otherwise be unable to work in a factory without having at least two days a week to devote to their domestic duties.

Fourth, more balanced production. With a definite amount of work to finish, the planning may be more exact when the forty-four hours, which the employee is required to work at this plant, are divided into five days instead of five and a half.—M. C. Hamblet.

SYSTEMIC OCCUPATIONAL DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

CIRCULATORY SYSTEM

Heart Disease in Industry—Border Line Cases. *Cadis Phipps.* Nation's Health, July 15, 1922, 4, No. 7, 434-435.—"It is not the obviously damaged heart which is neglected; it is the obscure, or borderline, case. A borderline case is oftentimes more amenable to treatment than the established or long-continued lesion, and so may be benefited if recognized. To determine if an obscure heart lesion be present, it is usually not sufficient to depend upon a routine physical examination; a careful history of the symptoms and a consideration of various etiological factors, combined with several physical tests, must be employed.

"Besides protecting the industry, the employee's health must be of prime interest. His interests are best served (in regard to cardiac disease) by (1) removal or preventive treatment of possible causes; (2) earliest possible recognition of cardiac disease; (3) complete rest for a sufficient period of time, followed by (4) a gradual return to working conditions, never reaching the limit of the heart's ability."—M. C. Shorley.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

Hazards of Carbon Monoxide from Gas Burners. *I. V. Brumbaugh* and *G. W. Jones.* Abstracted from Gas Age-Record, 1922, 49, 427-429, by J. L. Wiley in Chem. Abstr., June 10, 1922, 16, No. 11, 1852-1853.—"Tests of the combustion products from burners using natural gas and burning in contact with utensils containing liquids at or below the boiling point of water show that CO is liberated in amounts depending upon: distance of the utensil above the burner; height of blue inner cone of flame; type of burner; flame characteristic (ratio of volume of primary air injected into burner relative to volume of gas consumed); rate of consumption of gas. No CO was found where the distance of the utensil from the burner did not allow the blue inner cone to touch the utensil. A yellow flame will produce CO at a rate greater than a blue flame. The chilling of the flame by the cold utensil produces CO. With a burner using 8 cubic feet of gas per hour and burning with a yellow flame in an unventilated room the CO % of the air increased from 0.02 at the end of 0.5 hour to 0.16 in 3.1 hours, at which time the flame was smothered, owing to the high % of products of combustion and the lack of supporting O."

MERCURY POISONING. *R. R. Sayers.* Abstracted as follows from U. S. Bur. Mines, Rep. Investigations No. 2354, 1922, in Chem. Abstr., July 20, 1922, 16, No. 14, 2367.—"Hg poisoning occurs whenever Hg in finely divided form, as in fumes, oil suspension, or aqueous solution, comes in contact with the skin, lung tissue or the digestive tract. The symptoms include stomatitis, salivation, tremors, with degenerative organic changes. Proper ventilation and personal cleanliness obviate most of the bad effects in those otherwise healthy. Hg appears to combine with the brain tissue and to interfere with motor but not sensory nerves. The mucous membranes become inflamed and ulcerated. Anemia is almost always present, very marked if exposure covers a long period. Remedial measures are principally forced ventilation and personal cleanliness. Attention to hygiene, including bathing, protection by clothing and masks, clean clothes, regular habits of elimination aided by Mg citrate are essential for health when exposure to Hg is continuous. Suggested rules are given in detail by which workers may avoid most if not all of the ill effects of Hg absorption."—Philip Drinker.

LEAD POISONING IN THE POTTERY INDUSTRY. Lancet, July 15, 1922, 203, No. 5159, 141-142. —Some increase in lead poisoning is recorded in the pottery industry during 1921, even though a particularly stringent code of regulations for its prevention applies to this industry. The increase in case incidence, however, is slight, and remains far lower than before the regulations were established—twenty-four cases in 1920, and thirty-four in 1921, in comparison with an annual average of seventy-six for the years 1909 to 1911. On the other hand fatal cases remain unreduced in number; but examination of length of employment of the victims disclosed the fact that the poisoning was incurred many years previously; thus, of eleven workmen who died from lead poisoning in 1921 nine had been employed on an average of thirty-four years. For a chronic poison like lead, many years must elapse before the benefit of lessened risk can find expression in mortality data.—E. L. Collis.

HEALTH AND THE FIVE-DAY WEEK FOR PAINTERS. *Louis I. Harris.* Am. Labor Legis. Rev., June, 1922, 12, No. 2, 126-127.—The writer studied 400 painters and learned that about 60 per cent. were suffering from lead poisoning, and about 40 per cent. had marked symptoms in an active form. About 9 per cent. showed that the poison was latent within various structures of the body. About 11 per cent. were borderline cases in which the evidence of the presence of lead in the various organs was strongly suggestive of beginning lead poisoning. The painter's trade has been shown time and again to be an extra-hazardous one. Physical strain adds to the danger, and various volatile poisons used are an additional menace. A relatively small proportion of painters can retain their place in the industry after the age of 50. The reduction of weekly hours of labor is a necessary health measure.—G. E. Partridge.

LABOUR MEMBERS' BILL CONCERNING THE USE OF WHITE LEAD IN PAINTING. Abstracted as follows from New Zealand Herald, Feb. 1, 1922, in Internat. Labour Office, Indust. and Labour Information, April 21, 1922, 2, No. 3, 34.—At a recent session of the New Zealand Parliament, a member contended that an excellent non-poisonous substitute for white lead in paint had been found, and that steps should be taken to prohibit the use of white lead, as it was an immense danger, not only to painters, but to the health of the occupants of houses.

LAWS AND REGULATIONS RELATING TO LEAD POISONING. *Gilbert Stone.* Abstracted from Publication of Imperial Mineral Resources Bur., London, 1922, pp. 250, in Internat. Labour Rev., June, 1922, 5, No. 6, 1026.—Legislative measures taken in the following industries are described: (1) lead mining; (2) lead smelting; (3) white lead; (4) manufacture of paints and coloring matter; (5) pottery (manufacture and decoration); (6) electric accumulators; (7) use of coloring matter; (8) lead-coating; (9) vitreous enamelling; (10) the twisting of wire dipped in lead; (11) file-cutting; (12) bronzing, lithographic, and printing processes.

In the second part of the book, the legislative texts are given in full. A chapter is devoted to compensation. An appendix gives the British regulation of August 23, 1921, concerning the manufacture of lead compounds (carbonate, sulphate, and acetate of

lead, etc.) and also the Act of November, 1921, relating to the employment of women and young persons in lead industries.—G. E. Partridge.

DUST HAZARDS AND THEIR EFFECTS

STUDIES IN EXPERIMENTAL SILICOSIS AND OTHER PNEUMONOKONIOSES. *A. Mavrogordato.* South African Instit. Med. Res., Johannesburg, 1922.—Three years ago Dr. Mavrogordato, who had worked in England with Dr. Haldane on the effects produced by dust inhalation, proceeded to South Africa to continue his studies on the Rand gold field, where silicosis is recognized to be a serious occupational danger. The present monograph, which has been awaited by all interested in the subject, is based upon experimental exposure of animals to dust inhalation, and upon clinical observations and material available at Johannesburg.

Dr. Mavrogordato first tells his story, setting forth his facts, his arguments, and conclusions; then in a series of appendices he describes in detail the methods followed in his experimental observations; finally he presents a series of 114 excellent microphotographs to illustrate the text. The whole work is of first-rate importance and decidedly advances our knowledge of silicosis. Epidemiological observations by Collis first drew attention to the peculiar danger in relation to dust phthisis associated with silica dust. Experimental work is now fully corroborating the importance of those observations, for the results obtained with silica dust are found to differ from results when other dusts are used. The old mechanical theory of the harmfulness of dusts now receives its quietus. "It is not the particle that penetrates the tissues, it is the tissues that take up the particle. . . . Solubility and chemical inertness or activity are important, but the sharp edges or acicular shape of dust particles are of little more than historical interest."

Dr. Mavrogordato describes his observations using various dusts; but reference to his work with silica particles needs only be given here, for he concludes that ultramicroscopic particles of chemically inert dusts are not dangerous. Silica particles appear to possess a peculiar property in protecting cells which ingest them from autolysis and from digestion in the lymph; and the suggestion is made that such particles are slightly soluble in the alkaline tissue juices, and that alkaline silicate so formed pervades the cell, preserving it like a mummy, as water-glass preserves eggs. Here we recall the work of Gye and Kettle, who insist upon the importance of the chemical factor in the behavior of silica dust and relate it to the formation of silicic acid. These workers have shown that silicic acid is in itself a poison, and that it breaks down tissue resistance to tuberculous infection. Cells containing silica particles flock together to form pseudo-tubercles, but not if they contain other dust particles; the appearances resemble those of a positive and negative Widal agglutination respectively. In this way fused aggregates of silica-laden cells are formed, constituting an anatomical tubercle; the similarity with early stages of tuberculosis is remarkable. Later the pseudo-tubercles undergo fibrosis and obstruct the lymphatics. Evidence is advanced that cells which ingest dust — that is, dust-cells — originate from the epithelium lining the alveoli and the blood vessels; they are macrophage cells of Metschnikoff.

The low incidence of phthisis among coal miners gives interest to inhalation experiments in which dust of coal and silica was used, and to the conclusion that "once silica is fixed in the lung tissues, coal exerts no eliminative effect, if anything the influence is in the opposite direction, but a prior or even simultaneous exposure to coal dust appears to set up a condition in the lung which is inimical to the fixation of silica." Possibly other organic dusts may exert a similar influence, but up to the present time no experiments have been undertaken. Collis has, however, pointed out that fireclay dust appears to preserve ganister-brick makers from tuberculous silicosis.

Mavrogordato lays particular stress on the part played by microbic infections in modifying and accelerating the pathological changes associated with silicosis, and suggests that while tuberculosis is by far the most important infection, other organisms may also

exert an influence. Here he finds explanation of the undoubted harm associated with abrupt variations in high air temperature and humidity which favor respiratory diseases in general. Apart from infection, simple silicosis is a stationary condition when exposure to dust ceases; but after infection it need not remain stationary, since microorganisms multiply on their own account.

The type of disease seen now is more dependent on concurrent infections than was the old type; first, because dust exposure has been lessened and, secondly, owing to the employment of more men of Afrikander stock with less inherited resistance, and of fewer men of salted Western European origin. Hence cases of massive fibrotic silicosis are now rare, but cases in which tuberculous infection is present at an early stage are more common. The suggestion made that great damage is done by the non-tuberculous infective factor is held to justify systematic investigation of the flora, other than the tubercle bacillus, commonly present in the sputum of miners. The whole monograph deserves careful consideration, not merely by those interested in tuberculous silicosis, but by those concerned with other manifestations of tuberculosis.—E. L. Collis.

Silicosis among Stonemasons. Abstracted from The Builder, Feb. 17, 1922, in Indust. and Labour Information, Internat. Labour Office, April 28, 1922, 2, No. 4, 42-43.—A report on silicosis among stonemasons was presented at a quarterly meeting of the Industrial Council for the Building Industry on February 10, in which it was stated that the Safety and Welfare Committee had concluded that the case for the inclusion of stonemasons in the Silicosis Act was an unanswerable one. It was shown that death from silicosis in this trade was in excess of the general rate comparable with it. A table was presented showing that the mortality was greater in sandstone districts in England than in limestone or granite districts.—G. E. Partridge.

Some Conclusions on Commercial and Experimental Methods of Collecting Dust and Fume in the Zinc and Blast Furnace Industries. *F. G. Breyer.* Informal address before the Portland Cement Assn., May 21, 1921. Reprinted in Jour. Am. Soc. of Heating and Ventilating Eng., 1922, 28, 288.—The author distinguishes between dust and fume primarily with regard to the fineness of the product. For his classification he places all dusts made by milling or comminution in one category, and fume products, such as potassium chloride and sodium chloride, iron oxide, and zinc oxide, in the other. The difficulties in handling fume products, such as are encountered in the zinc industry, are discussed, and a theoretical explanation of the physical state and size of the particles is advanced. The effect of "clumping" or flocculation of particles is pointed out and the importance of getting the particles into this state, if they are to be collected, is mentioned.—Philip Drinker.

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

The Diagnosis of Pulmonary Tuberculosis from the Standpoint of the Industrial Physician. *Frank A. Craig.* Am. Rev. Tuberc., June, 1922, 6, No. 4, 265-281.—The author summarizes as follows:

"1. We believe that for the early detection of pulmonary tuberculosis there can be no question that the carefully conducted health survey is the most valuable method at our command, especially valuable being the entrance examination, combined with periodic reëxaminations of the entire force.

"2. The diagnostic standards adopted by the National Tuberculosis Association do not appear to be applicable in the routine examination of large industrial groups.

"3. The tuberculosis incidence rates which appear in literature as the findings of medical examiners in their studies of numerous industrial bodies are so lacking in uniformity and are so frequently unaccompanied by qualifying, defining, or explanatory information that they are almost valueless for comparing the findings of one industry with

those of another. It would seem as though some standardized method for reporting such cases was definitely needed, before it would be possible to establish average tuberculosis morbidity rates for various occupations."

In conclusion the author states:

"1. The examination of large bodies of men for the presence of pulmonary tuberculosis presents many, but not insuperable, difficulties, and in each case the diagnosis must rest upon a careful correlation of all the findings. While the most important information is that obtained by a physical examination of the patient, including inspection, palpation, percussion and auscultation, there are other methods of study which possess considerable value in the formation of the diagnosis.

"2. The *history* of the case is of the utmost importance, but is seldom obtainable or reliable in the study of large groups of men.

"3. In the routine examination of large bodies of men the recording of *temperature* seems to be of questionable value, although it may prove invaluable in the study of individual cases.

"4. From the standpoint of tuberculosis the recording of the *pulse rate* offers very little if any information of value.

"5. *Loss of weight* is a finding of considerable value and one which is readily obtained. The age and height must be taken into consideration in studying the weight of the individual.

"6. A systolic *blood pressure* which is below the normal for the age of the patient is a very suggestive finding. The recording of the blood pressure should be included in the study of every large body of men for many reasons."

OCCUPATION AND TUBERCULOSIS. *Koelsch.* Abstracted from Zeitschr. f. Tuberk., Oct., 1921, 34, p. 581, in Am. Rev. Tuberc., July, 1922, 6, No. 5, 147.—"We must make a distinction between a case of pulmonary tuberculosis due to childhood infection which is provoked into activity by occupation and a case due to massive reinfection of the worker in the factory. In the former the occupation *per se* causes a flaring up of a process already present from childhood; in the latter the active tuberculosis is caused not so much, if at all, by the occupation, but merely by an accident of circumstances such as careless expectoration by tuberculous workmen in the shop. Besides these direct causes of occupational tuberculosis, there are indirect causes, such as poor wages and consequent poor housing, poor food, scant clothing, etc. Only cases of the first kind should be considered as occupational tuberculosis. The main occupational cause of activation of a quiescent tuberculous process is dust. Only certain types of dust, however, are responsible for the activation of a latent tuberculous process, namely, dust that remains in the lung tissue, such as quartz and silica; whereas coal dust is in great part transported from the lung by the phagocytes and the lymph channels. Of 1,800 persons examined, 100 were stone-masons, 1,000 porcelain workers, 100 ball-bearing grinders, and 600 workers in cement, with a percentage incidence of siderosis of 63, 45, 30 and 15 respectively. Siderosis often activates a latent tuberculous process, but the percentage in the above-mentioned workers was not ascertained."

THE RELATIONSHIP OF TUBERCULOSIS AND INJURY. Tubercle, June, 1922, 3, No. 9.—Dr. N. Tattersall challenges the accepted opinion that tuberculosis may be determined by trauma, pointing out that experimental work on the one hand and war injuries on the other do not support this view. He considers, however, that the evidence is clear that injury may activate pre-existing and possibly latent foci, and that as a result a sudden massive dose of bacilli may be disseminated through the tissues. In pulmonary cases the mediastinal glands are probably the site whence dissemination follows upon injury. When lighted up by injury tuberculosis appears promptly, that is, after a few days or weeks. Hence, in considering any case, knowledge of previous health and of the rapidity of development after the injury, is of great importance.

Dr. A. Brownlee reviews the literature and describes cases in support of Tattersall's view that while trauma may aggravate, it seldom, if ever, originates tuberculosis. He points to the rarity of tuberculosis among the numerous group of athletic injuries. Injuries are common and tuberculosis is not unusual, but

the combination is sufficiently unusual as to fall within the limits of coincidence.—E. L. Collis.

THE COAL MINE AS A TUBERCULOSIS SANITARIUM. Am. Labor Legis. Rev., June, 1922, 12, No. 2, 131.—Mortality statistics cannot be accepted as an indication that coal mining is a desirable occupation for tuberculous patients (although it has been stated that coal dust may not be injurious to the lungs). Lack of rest and of sunshine, exposure to changing temperature, poor housing, etc., are not favorable conditions for the tuberculous. The death rate from tuberculosis among miners is perhaps lessened by the high rate of deaths by accident, and by the fact that tuberculous miners seek other occupations in which to die.—G. E. Partridge.

SYPHILIS AS AN ECONOMIC FACTOR IN INDUSTRY. *J. M. Quirk.* Reviewed from Internat. Jour. Surgery, May, 1922, 35, No. 5, in Pub. Health Jour., July, 1922, 13, No. 7, 333.—"The author gives a general discussion of the history and prevalence of syphilis. Syphilis attacks every organ and tissue in the human body and simulates almost every known disease. Its lesions are not always easy to distinguish, and the author states that he often has men reporting all sorts of injuries that are primarily due to syphilitic lesions. In its late manifestations with the involvement of the deeper tissues, we again have a serious economic charge against industry. The diseased bone of the syphilitic snaps in some slight injury and convalescence is prolonged beyond the normal limit. The patient affected with syphilitic aortitis dies from some slight injury—industry pays. A trivial trauma to the head may be followed by an epileptiform attack common to syphilis, and industry pays. A neurosyphilitic loses muscular co-ordination or mental concentration, an accident occurs and industry pays. What shall industry do? Encourage education and treatment. Lecturers should be engaged, for lecturers are preferable to pamphlets, because many will listen to that which they are unwilling to read. The author recommends, besides, prophylaxis and prophylactic education for industry."

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

DERMATOSIS FOLLOWING THE USE OF CUTTING OILS AND LUBRICATING COMPOUNDS. *William J. McConnell.* U. S. Pub. Health Ser., Pub. Health Rep., July 21, 1922, 37, No. 29, 1773-1794.—An excellent critical inquiry of the subject is presented, together with a bibliography. *Part I* discusses the advent, classification, analyses, uses, application, reclamation and sterilization of cutting oils and lubricating compounds. *Part II* deals with cutting-oil dermatosis — its prevalence, lesions, symptoms, prevention, and theories as to its causation.

Several plants were studied. Recommendations for the prevention of dermatosis consisted in the use of a sawdust-liquid soap mixture for thoroughly cleansing, followed by the application of lanolin before beginning work in the morning, and after lunch. After work the hands were to be washed with warm water and soap, and dried. No emollients were to be applied unless actual abrasions were present. Lesions on the thighs are best prevented by wearing aprons impermeable to oils. In plants where the preceding precautions were strictly enforced, the dermatoses were eliminated within eight months; in plants where the preventive measures were available but not enforced 21 per cent. of the former patients still had dermatosis, and when the measures were not supplied, though recommended, 48 per cent. still had dermatosis.

The oils and compounds produce initial dermatosis by obstruction of the sebaceous follicles—the underlying cause being a deficiency of the natural oiliness of the skin. Infections are secondary.

Prevention depends upon thorough cleanliness and the application of lanolin and castor oil to the skin before beginning work. Cure is accomplished by rest of the affected part and by constant use of the preventive measures.—B. Cohen.

SKIN IRRITANTS: EXTERNAL AND INTERNAL. *C. Guy Lane.* Boston Med. and Surg. Jour., July 20, 1922, 187, No. 3, 108-115.—In a re-

view of the records of 600 cases with the diagnosis of dermatitis at the Massachusetts General Hospital Out-Patient Department, 11 per cent. were found to be of industrial or probably industrial origin, housewives being included in this classification. For the dermatitis of printers, the use of a mixture of liquid soap and sawdust for cleaning purposes and of lanolin and oil before going into the pressroom was sufficient to prevent further eruptions. Among rubber vulcanizers using hexamethylenetetramine, the immersion of exposed parts in an alkaline solution, such as a saturated sodium bicarbonate solution, before going to work, prevented eruptions in sensitive individuals. Mention is made of dentists susceptible to novocain.—**B. Cohen.**

ARSENICAL PIGMENTATION OF THE SKIN. *D. W. Montgomery* and *G. D. Culver.* Abstracted as follows from Med. Rec., 1922, 101, 665-667, by F. S. Hammett in Chem. Abstr., June 20, 1922, 16, No. 12, 1988.—"Skin pigmentation by As is an example of the stimulating effect of the element on metabolism."

AGRICULTURAL CONJUNCTIVITIS. *James F. Patton* and *Sanford R. Gifford.* Am. Jour. Ophth., Aug., 1922, 5, No. 8, 623-637.—The author concludes as follows:

"1. Six cases were seen, all but two of which presented the common features of enormous swelling of the lids, swelling of the regional lymph nodes, superficial necrosis of the skin of the lids, and membrane on the conjunctiva. The other two, though lacking one or two of these signs, were similar enough to warrant their inclusion as atypical cases.

"2. All occurred in healthy adult or adolescent males engaged in outdoor occupations.

"3. Three gave a history of slight trauma to the conjunctiva or lids. None had been exposed to diphtheria or showed any signs of it on other mucous membranes.

"4. Mixed infection was present in all cases, the streptococcus, staphylococcus, *B. xerosis,* and a large grampositive anaerobic bacillus being found. The last was probably present in five of the six cases, and on account of the rarity of similar findings on normal lids or conjunctiva, is considered as possibly having an etiologic relation to the cases.

"5. The cases seemed to form a distinct enough clinical picture to warrant their inclusion in a group for which the name 'agricultural conjunctivitis' is suggested."

OCCURRENCE AND PREVENTION OF INDUSTRIAL ACCIDENTS

INDUSTRIAL ACCIDENTS. *S. Garcia-Tornel.* Abstracted as follows from Rev. Espanola Med. y Cirugia, Feb., 1922, 5, No. 44, 78, in Jour. Am. Med. Assn., June 3, 1922, 78, No. 22, 1767.—"This is a detailed report of the recent Spanish congress on industrial accidents, the first of its kind. The address of the president, Dr. Oller, was entitled 'Medical reforms necessary to introduce in the bill now pending on industrial accidents.' A resolution was adopted to the effect that when an operation is necessary and harmless, the injured workman should be given the choice of submitting to the operation or relinquishing his claim for indemnity. Another resolution referred to a conflict of opinion between medical experts in cases involving workmen's compensation. In this case the workman should be examined by the local professor of surgery, a hospital surgeon, and a surgeon member of the Academy of Medicine or, if not available, a corresponding trio appointed by the local medical society. One resolution stated that hernia and lumbago should not be considered as permanent disabilities."—C. K. Drinker.

INDUSTRIAL ACCIDENTS IN MEXICO DURING 1920. Abstracted from Internat. Labour Office, Indust. and Labour Information, Jan. 13, 1922, p. 50, and Feb. 3, 1922, p. 47, in U. S. Bur. Labor Statis., Month. Labor Rev., June, 1922, 14, No. 6, 155.—"An official report of industrial accidents in Mexico during 1920 shows that the mining industry was responsible for 6,719 of the 7,019 accidents, affecting 7,031 and 7,404 persons, respectively. The transportation industry stood second with 122 persons injured in 114 accidents, and metallurgy third with 127 persons injured in 77 accidents. Of the 7,404 injuries, 6,247 were slight, 798 serious, and 359 fatal. Of the

nonfatal accidents 94.96 per cent. occurred in mining, 1.70 per cent. in metallurgy, and 1.65 per cent. in the transportation industry. A total of 471,732.98 pesos ($235,158.89, par) was paid out in the form of indemnity and aid.''

ACCIDENT PREVENTION A BRANCH OF WELFARE WORK. *D. D. Goldingham.* Indust. Welfare, 1922, 4, No. 8.—This is the first of a series of articles to appear on this subject. It is stated that welfare workers have not paid much attention to accident prevention as yet, first, because of their misconception of the causes of accidents, and secondly, because of the high standard of machine guarding in factories inspected by the factory department. ''An understanding as to the real cause of accidents and the psychology of human beings is of greater value in the preventive field than an intimate acquaintance with machinery or machine guarding.'' Hence the welfare worker has an important part to play. A table containing the results of the investigation of 5,000 industrial accidents is given. Of this number 29.42 per cent. were non-mechanical; of the mechanical accidents (20.58 per cent.) it is doubtful if 10 per cent. could have been prevented by more efficient safety devices.—E. Hewitt.

ACCIDENTS AT METALLURGICAL WORKS IN THE UNITED STATES DURING THE CALENDAR YEAR 1920. *William W. Adams.* U. S. Bur. Mines, Tech. Paper 297, 1922, pp. 28.—''The tables in this publication have been compiled by the Bureau of Mines from reports furnished voluntarily and directly by operators of ore-dressing plants and smelters throughout the United States, with the exception of information for the States of California and Utah. The statistics herein presented, although not altogether complete, represent the entire metallurgical industry except iron blast-furnace plants, accident reports for those not being received by the Bureau of Mines. The figures for smelting plants cover copper, lead, gold, and silver smelters and refineries; those for ore-dressing plants represent concentrating plants for copper ores, lead ores, zinc ores, stamp mills, cyanide plants, iron-ore washers, flotation mills, and sampling works.''—M. C. Hamblet.

COAL MINE ACCIDENTS. Am. Labor Legis. Rev., June, 1922, 12, No. 2, 122-124.—The United States Bureau of Mines reported 2,271 fatal coal mine accidents for the country in 1920, and only 13 per cent. less in 1921, although production was 23 per cent. lower. Probably more than 150,000 non-fatal accidents occur annually in the coal mines in the country. The fatality rate in the coal mines in the United States is three times as high as that of Great Britain, and has been so for many years. The rate in 1910 was four times as high as in Belgium and Austria. The causes are insufficiently stringent laws, inadequately trained inspectors, ignorant foremen and fire bosses, indifferent employers, uninstructed and careless miners. We have not yet eradicated one-half of the preventable deaths.—G. E. Partridge.

PROGRESS IN DUST-EXPLOSION PREVENTION. *David J. Price.* Chem. and Metall. Engin., June 28, 1922, 26, No. 26, 1203-1206.—The author gives a summarized account of explosions in industries where fine dusts of a highly oxidizable type are encountered. Among the explosives, the powders enumerated are flour, cereals, feed, starch and corn products, chocolate, cocoa, aluminum, and hard rubber. Efficient methods of collecting and handling the fine dusts are the obvious remedies suggested.—Philip Drinker.

INDUSTRIAL SURGERY

LOW BACK PAIN: ITS CAUSE. *J. T. O'Ferrall.* Abstracted from Jour. Bone and Joint Surgery, April, 1922, 4, No. 2, 384, in Jour. Am. Med. Assn., June 3, 1922, 78, No. 22, 1757.—''Thirty-seven of the forty patients whose histories are reviewed by O'Ferrall designated the lumbosacral joint or the lumbosacral angles as the point of pain, and in each instance tenderness existed at this point or points. Two designated the left hip and thigh and leg as the site of pain, which was probably referred pain due to pressure of the lumbosacral cord from swelling of the lumbosacral ligaments. One patient referred his

pain to the sacrum. Examination revealed that spasm of the spinal muscles existed in some decided form, varying from slight restriction of the spinal motions to complete rigidity, including also so-called 'sciatic scoliosis,' in thirty cases. Inspection of the teeth showed that infective foci existed in the form of necrotic teeth, crowns and fillings (potential infectious foci) in eighteen cases. Five cases showed infected tonsils or nose; seventeen were negative for pathology, and eighteen showed no record had been made of an examination of the nose and throat. The treatment given consisted mainly in clearing up infectious foci, administering mixed treatment for those having a positive Wassermann reaction, or who were otherwise suspected of having syphilis, and in giving occasional doses of acetylsalicylic acid and cincophen. In many cases no other treatment was required than fixation of the spine. O'Ferrall believes that too much dependence is put on the roentgen ray as an aid to diagnosis.'' —C. K. Drinker.

Study of 208 Cases of Lower Back Pain. *J. R. Kuth.* Abstracted as follows from Jour. Bone and Joint Surgery, April, 1922, 4, No. 2, 357, in Jour. Am. Med. Assn., June 3, 1922, 78, No. 22, 1757.—''Pain in the lower half of the back was the chief complaint in all cases analyzed by Kuth. The most frequent site was the sacro-iliac area, 97 times. Next in frequency were: the lumbar area, 55 times; lumbosacral area, 31 times; gluteal area, 19 times; dorsolumbar area, 11 times; coccygeal area, 4 times; dorsal area, 2 times, and in the midsacral area, once. Aside from pain in lower back, 149 subjects complained of other pains radiating into the lower extremities; in 140, the pain followed down the posterior thigh and often into the outer aspect of leg and foot. These pains were always found on the same side as the back pain or on the side where the back pains were severest. Kuth suggests that in all cases of low back pain the possibility of a progressive disease of the spine or of the spinal cord should be kept in mind. The best results from treatment were obtained in cases in which static abnormalities were corrected, in which lower back structures were protected or put at rest, and in which such structures, if shortened, were stretched. Graduated systematic exercises were an important adjunct in the treatment of many of these cases.''—C. K. Drinker.

Traumatic Osteitis of the Wrist. *Mark H. Rogers.* Boston Med. and Surg. Jour., June 1, 1922, 186, No. 22, 730-733.—There is a condition of the wrist that involves one of the carpal bones, either the semilunar or scaphoid, which is often mistaken for tuberculosis, infectious arthritis, or fracture. The onset is very gradual, a matter of months, and follows trauma. There is no trouble for the patient as long as the wrist is rested. Upon return to mechanical work, the disability becomes acute. Three such cases occurring in mechanics are described.—B. Cohen.

INDUSTRIAL PHYSIOLOGY: NUTRITION, METABOLISM, FATIGUE, ETC.

Stature in Relation to Physical Standards of Fitness. *C. R. Sylvester-Bradley.* Proc. Roy. Soc. Med., June, 1922, 15, No. 8, War Section, pp. 18-25.—The author concludes as follows:

''(1) That the common practice of using age as the basis for tabulating anthropometrical statistics is fundamentally wrong.

''(2) That standards of physique may be very closely correlated to the trunk length or stature in the normal individual up to the age of 21 years.

''(3) That our physical standards of fitness for the enlistment of recruits into the various services require considerable revision.

''In conclusion, I would remind you that our standards of physique have been arrived at empirically, that is to say, on the false assumption that men of equal physique should be capable of performing an equal amount of work in a given time; but physique is of no value to a soldier or sailor unless he possesses the vigour and mental capacity to carry out all the duties he may be asked to perform in actual warfare.

''To obtain soldiers, sailors or airmen best fitted for the warfare of the future, the recruiting medical officer must be something

more than the hidebound automaton he has been in the past. He must be intimately acquainted with all the characteristics of normal man. To quote from Professor Karl Pearson in his Presidential Address to Section H of the British Association for the Advancement of Science, 1920: 'Psychophysical and psycho-physiological characters are of far greater weight in the struggle of nations today than the superficial measurements of man's body. Physique, in the fullest sense, counts for something still, but it is physique as measured by health, not by stature or eye-colour. But character, strength of will, mental quickness count more, and if anthropometry is to be useful to the State it must turn from these rusty old weapons, these measurements of stature and records of eye-colour, to more certain appreciation of bodily health and mental aptitude, to what we term vigorimetry and to psychometry.' ''—M. C. Shorley.

Alcohol and Industrial Efficiency. *Edgar L. Collis* and *Thomas Oliver*. Brit. Med. Jour., Aug. 12, 1922, 2, No. 3215, 244-248, 251-252.—A discussion of this subject which took place at the annual meeting of the British Medical Association, in July, was opened by Professor Collis.

Taking industrial efficiency to mean the carrying on of productive labor with a minimum expenditure of energy, whether such be physical or mental, or be represented by an equivalent in wages or by the money expended on raw material or necessary plant, Dr. Collis defined the subject for discussion to be whether the consumption of alcohol exerts any influence upon these factors, and if so, in what direction. He distinguished between convivial and industrial drinking, but stated his case under the latter heading, at the same time widening its scope to cover working while the system contains alcohol, irrespective of whether the alcohol is introduced during or before working hours.

Bodily activities he divided into reflex and volitional. Study of the reflexes displayed alcohol as a drug which depresses, and while there was a want of direct evidence that the slowing of the reflexes interfered with industrial efficiency, indirect evidence was found in accident occurrence. He mentioned the relationship of an increased accident incidence to pay-day when drinking facilities are unrestricted, and the disappearance of the marked features of this relationship with restricted measures and particularly with prohibition. He quoted Dr. Vernon's experiences with munition workers, before and during the period of restriction on the sale of alcohol, and also gave various American figures showing the effect of prohibition.

Dr. Collis stated that no definite evidence had been acquired, under industrial conditions, of the effect of alcohol upon the efficiency of volitional acts, but that laboratory research had provided certain definite information. He quoted the work of Rivers, Mellanby, Vernon, and of McDougall and Smith, to show that alcohol is not a source of energy for muscular contraction, that it interferes with neuromuscular co-ordination, and that it has a narcotic influence on power of judgment and discrimination. Evidence from industrial experience in this country appeared to be confined to the apparent influence of alcoholic indulgence during the week-end in bringing about lost time on Mondays—evidence which was supported by American experience before prohibition. He again quoted American experience to show increases of output following upon prohibition. A great cause of lost efficiency is labor turnover, but there appeared to be no reliable evidence of the effect of alcohol consumption upon this. He considers that industrial efficiency is interfered with by the habit of spending upon drink money which should be used for purchasing food. The lower the social scale, the greater the proportion of income spent on alcohol—a fact which means that normal laborers who particularly require energy-producing food are not likely to get the proper quantity. He summed up the position as follows:

1. Alcohol is a drug possessing energy which the body can use, but probably not for muscular work.

2. Alcohol interferes adversely with reflex acts and neuromuscular co-ordination. The higher the concentration in which it is consumed the more pronounced is the effect.

3. Alcoholic habits vary with the industry, and where they are most pronounced time-keeping is most irregular.

4. Industrial accidents are increased by

the consumption of alcohol even though in moderate amounts.

5. There is no evidence, either experimental or practical, that alcohol is advantageous to industrial efficiency, but there is much evidence that it is harmful.

6. Prohibition in America appears to be associated with greatly improved industrial efficiency, whether measured by accident frequency, lost time, or output.

Sir Thomas Oliver, in an extremely useful contribution to the discussion, expressed a very definite belief that during the past fifty years all classes of society in the country have been marching toward sobriety. Employment generally, certain trade processes particularly, and also the amount of wages paid—all have an important bearing upon industrial drinking habits; it was his opinion that the establishment of works canteens had done much toward solving the problem. He thought that each industry should attempt to solve the question for itself. He quoted figures which showed that in a coal mine in South Wales the teetotal miners sent to bank 100 tons of coal for every seventy-two sent up by miners who indulged too freely in alcohol; also that in an electrical engineering works in the south of England, where all the employees were abstainers, absenteeism averaged only 0.5 per cent. and the accident claims but 8 per cent. of the premiums paid; whereas in workshops accident claims generally formed 66 per cent. of the premiums paid.

Sir George B. Hunter, of the shipbuilding firm of Swan, Hunter and Richardson, had given Dr. Oliver a statement of the comparative number of hours worked by riveters who were abstainers and riveters who were known to be unsteady. The investigation extended over three weeks and included overtime. The average number of hours worked per week by six total abstainers was 67, 62, 61, 70, 70, and 55, and by four men who were known to be unsteady, 45, 51, 43, and 29. The number of hours worked overtime by the first six was 14, 11, 6, 16, 17, and 6; and by the latter four 16, 10, 3, and 3. No man could do his best, or even any reliable work, after the free use of alcohol.—W. F. Dearden.

How Correct Seating Affects Manufacturing Profits. *Irving Salomon.* Indust. Management, June, 1922, 63, No. 6, 326-336.—The importance of the problem of seating lies in its relation to fatigue; and fatigue in turn is closely related to production. Many firms do not yet realize that the problem of factory seating is an individual problem, and that, to be correct, a chair or stool must be adapted to an individual.

There are four elements in the construction of seating: height, seat, back rest, and foot rest, the specifications of which are dependent upon the machine or bench and the nature of the operation.

The first consideration in seating is the construction of a bench. Its height should depend upon the stature of the worker and his relation to the bench or working surface. The most satisfactory seats (as specified in Special Bulletin No. 104 of the Department of Labor of New York) are slightly saddle-shaped and about 16 inches wide. For most work, a seat 12½ to 13½ inches in depth, with the front ½ inch to 1 inch higher than the back, is suitable. In some operations performed at high benches, the round wooden seats have been found to be fairly satisfactory, but these should not be less than 14½ inches in diameter. For some types of work a revolving seat is good.

Practically every investigation has led to the recommendation of backs or back rests on stools as well as on chairs.

Workers should never be obliged to let their legs dangle or to wind them around the legs of the stools. The foot rest (when the chair is somewhat over 18 inches high, the average operator cannot put his feet well on the floor) should be 10 inches or more from front to back and wide enough to hold both feet. A rail or a ledge is not sufficient.

The "sitting-standing principle" has received but little attention from manufacturers as a whole until recently. This means the arrangement of working equipment, particularly the seats, so that a given operation may be done equally well, sitting or standing. Practically everything that has been written on industrial seating approves of this variation principle, and it is probably one of the most direct means of promoting increased production.

The article contains fifteen figures showing types of seating, and equipment, correct and incorrect.—G. E. Partridge.

WOMEN AND CHILDREN IN INDUSTRY

WOMEN IN GEORGIA INDUSTRIES. U. S. Dept. Labor, Women's Bur., Bull. No. 22, 1922, pp. 89.—The surveys reported were made in the periods from May 28 to July 13, 1920, and from February 15 to April 15, 1921. The first was made in Atlanta, the second extended over the remainder of the state of Georgia; in the sixteen cities and towns included, there were in all 131 establishments employing 9,900 women and girls.

It was found that 64.3 per cent. of the women were employed ten hours or more daily, and only 12.7 per cent. worked less than nine hours. Thirty per cent. of the women had a lunch period of thirty minutes, and the same number were found to have one hour. Median weekly earnings of white women were $12.20, of negro women $6.20.

Workroom conditions reported for 122 plants were as follows: overcrowded and untidy workrooms in 39 plants; cleaning arrangements unsatisfactory in 54; natural lighting inadequate in 22; and artificial lighting inadequate or badly placed in 74; seats either insufficient in number, or makeshift, in 58 places; hazards such as unenclosed overhead belts, unguarded wheels, and set screws, unguarded elevator shafts, in 53 plants; fire hazards in more than one-half the establishments; common drinking cups or none in 81; washing facilities unsatisfactory in 98 plants, and lacking in 9; toilets insufficient in number in 59, and, in 10, men and women using the same toilets. In 101 establishments there were no lunch rooms; in 95, no rest rooms; in 78, no cloakrooms; in 49, no first-aid equipment.—G. E. Partridge.

CHILD LABOR AND THE WORK OF MOTHERS IN OYSTER AND SHRIMP CANNING COMMUNITIES ON THE GULF COAST. *Viola I. Paradise*. U. S. Dept. Labor, Children's Bur., Pub. No. 98, 1922, pp. 114.—The Children's Bureau of the United States Department of Labor made an investigation of the conditions under which mothers and children work in nine communities in Mississippi, Louisiana and Florida. In all, 423 families with 1,350 children under 16 years of age were included in the study. The work that was investigated consisted largely of shucking oysters and peeling or picking shrimps. Of the children from 10 to 15 years, 25 per cent. were illiterate; and of 649 children from 7 to 13 years of age, 41 per cent. did not attend school.

Most of the cannery work is wet and dirty and is done in cold, damp drafty sheds, the workers standing among the empty oyster shells or shrimp hulls. There are also certain hazards; cuts are frequent and an acid in the head of the shrimp so affects the hands that many persons can work only a few days at a time, and are then obliged to rest to allow the hands to heal.

Earnings are low, and workers who are imported during the seasons are housed in so-called camps which usually are long, low frame buildings, poorly constructed, offering a minimum of privacy, sanitation, and protection against the weather. Serious difficulties are met by families having young children whose mothers work. The work is irregular and the canneries are situated in isolated places making any enforcement of a child-labor law difficult. Hours of work are long and the rates of pay are arbitrary.

The conditions in this industry are described in detail in the report, which includes tabulated data concerning the employment of children, housing, etc., and several illustrations showing processes and conditions. There is an appendix containing the child-labor and compulsory education legislation in effect in Florida, Louisiana, and Mississippi, on January 1, 1919.

No investigation has been made to determine whether the federal child-labor tax law, imposing a 10 per cent. tax on canneries, mills, factories and workshops that employ children under 14 years of age, or children between 14 and 16 years for more than eight hours a day or before 6 A. M. or after 7 P. M. has had the effect of eliminating the younger workers in the industry studied. No steps have been taken by this legislation toward providing necessary schools and lengthening the short terms that prevail in some places. Special provision is needed to solve the problem of the children of migratory families, since neither the community whence they come nor the one in which they live temporarily feels responsible for their education and welfare.—G. E. Partridge.

ACCIDENT HAZARD OF WORKING CHILDREN. U. S. Bur. Labor Statis., Month. Labor Rev., June, 1922, 14, No. 6, 149-150.—The Statistical Bulletin of the Metropolitan Life Insurance Company, of March, 1922, showed that among the policy holders of the company there were 199 fatal accidents among working boys between the ages of 13 and 17, in 1921, 43 of which resulted directly from the work in which the boys were engaged. A recent study in a textile mill in Connecticut showed that of 1,164 accidents in which the ages of the workers were known, more than one-fourth occurred among employees under 20 years of age, although this group included only 15 per cent. of the number employed. In Massachusetts, there were 1,691 industrial accidents to children under 16 years of age in 1919 to 1920, 10 of which were fatal, and a larger proportion resulted in total disability than in the case of older workers. During the past four years there were 4,663 industrial accidents to children under 16 years of age in Pennsylvania, 10 of which were fatal. During these years there were in all 59 fatal accidents to children of 16 and 17 years, although the law prohibits the employment of minors under 18 years of age in extrahazardous occupations.

There is a necessity for proper vocational guidance and better supervision of children at work, but notwithstanding many safety devices and safety campaigns the high percentage of injuries among boys and girls remains. It is suggested, therefore, that young people lack the qualities of attention, concentration, and carefulness that insure safety in industry; the natural carelessness of children, their adventurousness, lack of muscular control, irresponsibility, and love of play are important factors in the high accident rate prevailing among them. There is a need, for these reasons, for strengthening these laws by specifying and increasing the list of occupations that are regarded as hazardous, and by raising the age at which children may be allowed to enter industry.—G. E. Partridge.

HEALTH EXAMINATION OF WORKING CHILDREN. Boston Med. and Surg. Jour., June 1, 1922, 186, No. 22, 744-745.—The Department of Labor and Industries of Massachusetts is publishing a form for use in the examination of children applying for employment certificates. The form is less detailed than the one recommended by the Children's Bureau. A copy of this form is printed.—B. Cohen.

INDUSTRIAL SANITATION: FACTORY CONSTRUCTION, ILLUMINATION, VENTILATION, HEATING, WATER SUPPLY, SEWAGE DISPOSAL

THE WORK OF THE AMERICAN BAKERS ASSOCIATION IN THE DEVELOPMENT OF A SANITARY CODE FOR THE BAKING INDUSTRY. *Harry E. Barnard.* Am. Jour. Pub. Health, June, 1922, 12, No. 6, 494.—Within the last few years the food industries have come to apppreciate the value and importance of sanitation. At the last convention of the American Bakers Association a new constitution was unanimously adopted. The purposes of the association were set out in part as follows:

"Section 1. The development of the baking industry by increasing the use of commercially baked products.

"(*a*) By securing wider application by bakers of improved methods and advanced baking practice.

"(*b*) By education within the industry, to raise the standard of sanitation and trade practices, and to promote the use of wholesome ingredients and the production of products possessing the greatest possible food values.

"(*c*) By encouraging proper, and discouraging improper legislation, and obtaining representation for the industry in all matters before federal and state bodies and consumers.

"(*d*) By promoting intelligent understanding on the part of the public in relation to the operating methods and practices of the trade.

"One of the purposes of the Association is the certification of member bakeries, and the requirements prior to certification are explicit. They read as follows:

LOCATION AND CONSTRUCTION OF PLANT

"1. Every bakery shall conform to the requirements of the sanitary codes or other

statutory provisions and regulations of the state, county, and city in which it is situated, with respect to its location and construction, bakery equipment, operating methods, and health of employees.

"2. Every bakery shall, in any event, conform to the following specific requirements which the Association deems essential:

"(*a*) The bakery shall be so located that drainage to sewers is adequate and that the basement and floors are not subject to recurring or foreseeable flooding.

"(*b*) It shall not be located adjacent to conditions or industries which are inimical to the production of wholesome bread.

"(*c*) It shall have convenient toilet rooms, separate and apart from the room or rooms where materials and doughs are kept and prepared, or where baked products are stored or handled.

"(*d*) Adequate and convenient wash rooms and toilet rooms shall be provided with soap, running water, and clean towels, maintained in a sanitary condition.

"(*e*) Rooms shall also be provided for changing and hanging wearing apparel, separate and apart from the production, storage, and sales rooms.

"(*f*) The bakery shall be properly protected from flies.

"(*g*) The bakery shall have suitable equipment for handling raw materials, doughs and finished products in a cleanly and sanitary manner.

"(*h*) There shall be sufficient ventilation and light provided to insure the health of the employees and the wholesomeness of the bakery products, free from excessive heat, fumes, dust and other conditions inimical to such health or wholesomeness.

Operating Methods

"(*i*) The floors, walls, and ceilings of every bakery, the equipment used in the preparation or handling of bakery products, or their ingredients, and the vehicles, boxes, baskets and other receptacles in which bakery products are stored, handled or transported, shall be kept in a clean and sanitary condition, free from all contaminating matter.

"(*j*) All bakery products and their ingredients shall be stored, handled, transported and kept in such a manner as to protect them from spoilage, contamination and unwholesomeness.

"(*k*) All workmen and employees, while engaged in the manufacture of bakery products, shall be clothed with external garments of washable material which shall be used for that purpose only, and these garments shall be kept clean.

"(*l*) The smoking, snuffing and chewing of tobacco shall be prohibited in the rooms of the bakery where the materials and doughs are kept and prepared, or where the baked products are stored or handled.

"(*m*) No animals or fowls shall be kept in or permitted to enter the bakery rooms where the materials and doughs are kept and prepared or where the baked products are stored or handled.

Health of Employees

"(*n*) No person affected with any contagious, infectious, or other disease, or physical ailment, which may render such employment detrimental to the public health, shall work in a bakery or handle any of the products therein or delivered therefrom. Freedom of bakery employees from any such diseases shall be evidenced by a certificate of medical examination, such examination to be made at least annually.

"(*o*) No person who has had typhoid fever shall be employed in any bakery until adequate clinical examination has proven the applicant free from typhoid bacilli.

"The Code of Ethics reads in part as follows:

"1. I recognize my duty to the American home to be to make my product of highest food value at lowest cost.

"2. I believe that the rendering of honest and efficient service on the part of my employees deserves fair consideration and that they should receive a fair return for their labor and be enabled to enjoy healthful surroundings, both physically and morally. I recognize a man's inherent right to work with freedom of conviction, without prejudice, and I will expect only an honest day's work and thoughtful consideration of our mutual interests and obligations.

* * * * *

"5. I will use no materials or ingredients other than those of known purity and wholesomeness in the manufacture of my products.

"6. I will at all times adhere rigidly to the truth in all my advertising.

"7. I will keep my plant and premises at all times as clean and sanitary as is humanly possible, and welcome public inspection at all times. I shall expect of my employees what the public has a right to expect of me, that we keep ourselves morally and physically clean.

"At least half of the entire bread production of the country, outside of the supply baked in the home, comes from the sanitary plants of Association members."—H. F. Smyth.

ECONOMIC VALUE OF MAINTAINING CLEAN WINDOWS AND LIGHTING FIXTURES. New York State Dept. Labor, Bull. No. 112, June, 1922, pp. 15.—The industrial loss from obstruction of illumination is to be considered as a practical problem; the cleaning of windows, of light bulbs, reflectors, globes and diffusers of artificial illuminating systems is considered as necessary as the sweeping of floors and the oiling of machinery. In cities where much soft coal is consumed, or where numerous chimneys exist, from which volumes of flue dust are ejected, and in places where dust or fibers are released in the processes of work, heavy deposits may be made on window panes, greatly reducing their transparency. The cleaning of windows with water, rags, chamois skins, brushes, and rubber scrapers is widely practiced. The materials generally used are soap and water, but they must be used properly. "There is a field for the person who can improve present day methods of cleaning lighting glassware, in respect to the kind of cloth or device to use, the cleaning compound and the possibility of saving labor."

The methods of cleaning used by three firms, showing ways of economical cleaning and of reducing hazards, are given, and there is a brief discussion of the effect of walls, ceilings, machinery, etc., on light. There are seven photographic illustrations and a photometric chart.—G. E. Partridge.

EFFICIENCY OF VARIOUS KINDS OF VENTILATING DUCTS. *C.-E. A. Winslow* and *Leonard Greenburg*. U. S. Pub. Health Ser., Pub. Health Rep., July 28, 1922, 37, No. 30, 1829-1839.—This is a study of the uniformity of air distribution attained with ventilating ducts of various designs. The British Departmental Committee on Ventilation of Factories and Workshops (1907) is convinced that the most important factor is the use of slanting branch ducts to the main ventilating duct for securing greatest evenness of exhaust or discharge of air. In the present investigation, it was found that without exception branch ducts gave better results than lateral ports. With either branch ducts or lateral ports, an untapered main duct gave better results than a tapered one. When other conditions were equal, plenum ventilation was more even than exhaust ventilation.

In order to secure the most even distribution, ventilating systems, on either the plenum or exhaust plan, should be constructed with slanting branch ducts, the question as to whether the main duct should be tapered or untapered, being decided by the relative cost of labor and materials involved. Reasonably good distribution can be economically effected with an untapered duct which discharges or exhausts through lateral ports. A tapered duct discharging through lateral ports is likely to give rise to serious irregularity in distribution.—B. Cohen.

INDUSTRIAL INVESTIGATIONS AND SURVEYS

TWO INVESTIGATIONS IN POTTERS' SHOPS. *H. M. Vernon*, assisted by *T. Bedford*. Indust. Fatigue Research Board, Report No. 18. His Majesty's Stationery Office, London, 1922, pp. 74.—(*Review by author.*) Part 1 of this Report, by H. M. Vernon and T. Bedford, is referred to in the article section of THIS JOURNAL, *4*, page 318. In Part 2, Dr. Vernon discusses the efficiency of various types of potters' drying stoves, with a view to determining whether the overheating of the shops, a condition produced by most of the types of stove in use, is unavoidable. In most of the stoves, there is a rapid current of

relatively cool air passing inwards from the shop through the lower part of the doorway or entrance, and a current of relatively hot air passing outwards into the shop through the upper part of the doorway. At some intermediate position, the "neutral point," air goes neither in nor out, but ascends vertically, owing to the heat rising from the bed of steam pipes on the floor of the stove. The velocity of these air currents was measured by means of the kata-thermometer, and their direction was tested by smoke paper.

It is generally assumed that the back draft air is laden with moisture, derived from the drying ware in the stoves. Numerous hygrometer observations showed that though the absolute amount of moisture in the outflowing air was greater than that in the inflowing air, the relative humidity of the air, or the degree of saturation with moisture, was very much less, owing to its high temperature. In fact, the drying power of the outflowing air, which is approximately indicated by the difference between its wet bulb and its dry bulb temperature, is usually about three times greater than that of the inflowing air. Again, it is generally assumed that the air in potters' shops is very moist, because of the back draft air from the stoves and the masses of wet clay in the shops, but this is not so. Owing to its high temperature, the degree of saturation of the air in the shops is no greater than the degree of saturation of the outside air at the same temperature. This was proved by many hundreds of hygrometer observations, inside and outside the shops.

Pottery manufacturers have always been uncertain as to whether, in the drying of ware of moderate size, it is better to have a rapid current of warm air, or a slow current of considerably hotter air. Both on theoretical grounds and as the result of actual experiment, it is concluded that high temperature is the chief requisite. For instance, let us suppose that one volume of air, on passing from shop to stove, is heated from 60° to 100° F., or alternatively four volumes of air are heated from 60° to 70°. It is calculated that the drying power of the air at 100°, in so far as it depends on temperature, is four times greater than at 70°; in so far as it depends on increased velocity, however, the drying power of the air at 70° would probably be only 25 per cent. greater than at 100°.

Of the various types of "dobbin" stoves examined, none were found to be efficient, in the sense that they not only dried the ware well, but at the same time allowed comparatively little of their heat to pass back into the shops. Some of the "chamber" stoves were quite efficient as long as their doors were kept closed, but many of them had such badly fitting doors, or the doors were so frequently kept open, that they could not be called efficient. The "draw-out" stoves, in which sections containing hundreds of hot moulds and ware were drawn out from the stove as they were wanted, were not efficient, as these sections gave off large amounts of heat to the shop. "Cabinet" stoves, as long as they were kept closed, were very efficient; but best of all were the "mangle-type" stoves, in which the ware was inserted on shelves near the bottom of the stove, and ascended gradually to the top near the vertical steam pipes. Then it descended, and by the time it had returned to the opening below, it had lost nearly all its heat.

Many of the stoves examined had no structural ventilation provided, but it was found that the back draft air from these unventilated stoves was not more saturated with moisture than that flowing from the ventilated stoves. The reason is that the presence of steam pipes on the floor of a stove automatically insures a good circulation of air. In unventilated stoves the whole of this air passes into the shop, but even in well-ventilated stoves usually over half of it passes back. Much can be done to reduce the back draft from chamber stoves by taking more care to keep the doors closed, while the draft from dobbin stoves can be diminished by blocking the gaps at the sides and top of the dobbins. It would be best of all to install cabinet and mangle-type stoves, and have an independent system for warming the shops, instead of depending upon the hot air derived from the stoves, as under present conditions.

AN INQUIRY INTO LABOR TURNOVER. CONDUCTED ON BEHALF OF THE NATIONAL INSTITUTE OF INDUSTRIAL PSYCHOLOGY. Jour. Nat. Inst. Indust. Psychol., 1922, 1, 103-107. — Of 172 workers engaged at a factory in one year, 121 left. Of these, eighty-eight left of their own accord, four-

teen were dismissed for unsatisfactory work, ten for reduction of the staff, and nine for other reasons. If those dismissed for unsatisfactory work and for reduction of the staff are excluded, the labor turnover works out at 105 per cent. per annum. All the workers engaged were fairly expert, but it was found that their output was about 20 per cent. below the average when they were first employed, and it did not reach a steady value for twenty weeks. It was calculated that the potential average output lost per worker leaving corresponded to eleven days' work. In addition to this direct loss of output there were indirect losses from spoiled work, waste of foremen's time in giving special supervision, extra clerical labor involved, and other causes.—H. M. Vernon.

INDUSTRIAL MORTALITY AND MORBIDITY STATISTICS

ESSAYS ON VITAL STATISTICS. *I. S. Falk.* Pub. Health Nurse, June, 1922, 14, No. 6, 299-310.—The registration of deaths is of great legal and commercial importance for several reasons. Adequate statistics for the whole of the United States are not yet available, for the entire country is not included in the registration area and, besides, there are various deficiencies in the reports. Even in communities having up-to-date statistical laws and offices, the deaths are not all registered, and, regarding cause of death, inaccuracy of certification is very great. The accuracy of diagnosis is shown to range all the way from 95 per cent. in diabetes mellitus to 16 per cent. in acute nephritis. Age, place of residence, and occupation are commonly given inaccurately and an intentional misstatement of the cause of death sometimes occurs.

Tables are presented showing death rates for the registration areas of the United States for the years from 1900 to 1920, and for some foreign countries and leading cities. Rates for urban and rural population, for white and colored persons, native born and foreign; age periods; sex; occupation; and dates are given, and some of the sources of misconception in the use of raw statistics are shown.

Statistics in nineteen occupations given by the Metropolitan Life Insurance Company for 1911-1913, for example, show the average age of bookkeepers at death to be 36.5, the lowest in the list, and of farmers and farm laborers, 58.5; but it does not follow that bookkeeping tends to shorten life. Proportionate mortality figures for occupations are apt to be misleading, since a low death rate may only indicate in a particular case that the deaths from other causes are unusually high.

A table showing the death rates from pulmonary tuberculosis in the United States registration area for 1900, although uncorrected concerning the ages of persons employed, shows what the real situation is with regard to the relation between tuberculosis and occupation:

Occupation	Deaths from Pulmonary Tuberculosis per 100,000 Persons 10 Years of Age and Over
Marble and stone cutters	540.5
Cigar-makers, tobacco workers	476.9
Compositors, printers and pressmen	435.9
Servants	430.3
Bookkeepers, clerks and copyists	398.0
Laborers (not agricultural)	370.7
All occupied males	236.7
Steam railroad employees	129.8
Clergymen	123.5
Miners and quarrymen	120.9
Farmers, planters and farm laborers	111.7
Lumbermen and raftsmen	107.1
Bankers, brokers and officials of companies	92.1

—G. E. Partridge.

ABSTRACT OF THE LITERATURE
OF
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GENERAL

THE PHYSICIAN IN INDUSTRY: A SYMPOSIUM. Nat. Indust. Conference Board, Special Rep. No. 22, June, 1922, pp. 98.—The National Industrial Conference Board has issued for the Conference Board of Physicians in Industry a report on the work of the physician in industry. This report is in the form of a symposium, contributed to by seventeen members of the Conference Board of Physicians, whose experience entitles them to speak with authority.

In this symposium are discussed many of the problems encountered in medical work in industry. Each author has contributed from his experience, and the collective experience of this group forms a source of information, rich in suggestion and fact, which should do much to identify and clarify the work of the physician in industry and to establish it as an integral and permanent part of the industrial organization.

Each writer has discussed his subject from his own viewpoint, and while the Conference Board of Physicians as a whole endorses these views, all controversial statements are personal opinions of the writers. The value of the work of the physician from the viewpoint of the industrial manager is discussed in the concluding chapter.

Among the questions discussed are physical examinations; training for first-aid; dental work in industry; the definition of the physician in industry and his relation to community problems; tuberculosis and heart disease among industrial workers; the relation of the physician in industry to the various applications of workmen's compensation laws, with special reference to hernia, eye in-

juries, back injuries and occupational diseases; and rehabilitation of the industrially handicapped.

This symposium brings together in concise form the present-day information regarding medical work in industry and makes available, in language readily understood by the layman, and particularly the industrial manager, the principal features of this form of industrial activity.—F. L. Rector.

Factors Determining the Length of Work Day. *Reynold A. Spaeth.* Nation's Health, Aug. 15, 1922, 4, No. 8, 488-490.—The striking fact about the figures respecting the length of day as related to output is the great disparity between the percentage reduction in hours and the change in production. In general it may be said that the chance of reducing hours without reducing output is directly dependent upon the percentage of human energy expenditure in any particular process. In automatic and semi-automatic machine processes the optimum point lies between a nine-hour and ten-hour day. As work becomes heavier with a longer handling time the optimum shifts toward the shorter day of seven or eight hours. Machine employees can be worked ten hours a day profitably to the employer, and, as far as scientific methods have determined, in most cases without physical injury to themselves, but whether this should be done or not is another matter.

The physical aspects of the work-day problem involve, in the last analysis, the discovery of the most efficient relation between work periods with their resulting fatigue and rest. There are, also, mental factors: If an organization is to be effective there must be at work subtle psychical factors involving both incentives to work and the mutual attitude of men and management. There are two groups of stimuli that urge men to work: necessity, and an internal urge, less understood in the craftsman than in the professional worker. It is possible to emphasize the former when the employer class can apply compulsion, but it is necessary also to release and make operative the internal compulsion which is analogous to the internal drive that stimulates the professional man. The variability of human beings must be considered; and considering this, it is probable that some kind of task system is better than fixed hours. If employers will try to develop the enormous source of compulsion from within, the work-day problem will have lost much of its present seriousness.—G. E. Partridge.

What India Is Doing about Factory Working Conditions. Abstracted from The Times (Trade Supplement), London, in Factory, July, 1922, 29, No. 1, 76-78.—A new factory provision in India prohibits very humid atmospheric conditions. An inspector is given authority to compel the repair of buildings or machinery which are in a condition dangerous to human life or safety. There is prohibition pertaining to the employment of women and children in factories. Rest hours are touched upon, at least one day in ten being for rest. Other general provisions are made.—M. C. Hamblet.

SYSTEMIC OCCUPATIONAL DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

A Heretofore Unknown Occupational Disease in the Rope Industry. *Franz Kazda.* Zentrlbl. f. Gewerbehyg., May, 1922, 10, No. 5, 140-142.—A rope maker who had to swing a heavy knife with his right hand developed a large mass on the left thoracic wall. This was composed of connective tissues, developing after he began this work. There was a history of peptic ulcer, followed by symptoms of pyloric stenosis. Operation confirmed the diagnoses, and a gastro-enterostomy gave relief. The trauma of the strain on the thoracic wall from swinging the heavy knife suddenly is thought to have caused undue motion of the stomach about the pylorus as a fixed point, with resulting irritation and predisposition to ulcer formation.—E. L. Sevringhaus.

CENTRAL NERVOUS SYSTEM

Occupational Neuritis of Glass Polishers. *Ludwig Teleky.* Klin. Wchnschr., July 22, 1922, 1, No. 30, 1507-1509.—The author

discusses the various forms of occupational neuritis according to origin, as physical, toxic, or mixed. After referring to the literature he discusses changes and especially paralysis caused by pressure on the ulnar nerve at the epicondyle of the humerus. He reports a series of eight cases in cut-glass workers. The symptoms varied from numbness and weakness of the fingers to paralysis and atrophy of the interosseous muscles in the ulnar region, and in one case the flexor carpi ulnaris was atrophied. He considers that on account of its relative insolubility the lead in the glass can be ignored; and that the causative factor is pressure. The workers lean on their elbows to steady their work and many show callus formation. The left arm is usually held steadier and is more often affected. The prognosis of the paralysis is eventually good, but the early paresthesia should be considered a warning, and protective measures should be taken. He discusses the physical therapy of the condition, and suggests that wider recognition of its occurrence will prevent mistakes in diagnosis. Treatment for syphilis had been erroneously given to one of his patients.—J. W. S. Brady.

CIRCULATORY SYSTEM

Heart Disease in Industry. *W. Irving Clark, Jr.* Boston Med. and Surg. Jour., July 1, 1922, 187, No. 1, 21-23.—A summary is given of observations at the Norton Company, manufacturers of abrasives, grinding wheels and grinding wheel machinery. Attention is directed to Dublin's review indicating that about 2 per cent. of all workers are liable to interruption of steady work, etc., because of heart disease. In industrial work, the most frequent heart lesion found is chronic mitral insufficiency without stenosis; and next in frequency is aortic insufficiency with mitral incompetence.

The average number of employees during 1920 at the Norton Company was 3,200; the number of records reviewed, 8,100; the number of cases of heart disease, 76; the percentage of employees having heart disease, 0.95; the number of persons with heart disease applying for work but rejected, 4.

It is interesting to note that the number of workers with heart disease is about one-half the usual number in industry. This may be due not so much to exclusion because of examination as to the fact that the cardiac worker tends to find his level. That is, the percentage employed in sedentary occupations ought to be higher.—B. Cohen.

The Heart Disease Problem in Industry. *Paul D. White.* Nation's Health, Sept. 15, 1922, 4, No. 9, 553-556.—There is no such complete entity as industrial heart disease. Cardiac symptoms and signs in the industrial worker are the result almost invariably of nervous fatigue or effort syndrome, or of damage by rheumatic fever, syphilis, arteriosclerosis, high blood pressure, or hyperthyroidism, and rarely result from accidents such as wounds to the heart, a blow on the chest, or unusual physical strain.

Accidents may involve the heart in three ways: (*a*) immediate reflex cardiac disturbances from injury to other parts of the body; (*b*) effort syndrome following accidents, particularly severe ones, in nervous people; (*c*) actual injury to the heart resulting from penetrating wounds of the heart and great vessels, from crushing injuries to the chest, blows, or falls causing rupture of ventricular or auricular wall, of the aorta, or of the valve cusps, or, finally, from rupture of the valves, the ventricle, or of an aortic aneurism from sudden violent effort.

Industry has to deal with the true heart disease type of disorder and with the functional disorder type. Thousands of persons with functional disorders have been classified as cardiac cripples and denied work. It is for industry, with proper protection to itself, to find suitable, not too exciting work for these individuals.—K. R. Drinker.

Occurrence and Significance of Systolic Murmurs in Healthy Individuals. *D. C. Parmenter.* Jour. Am. Med. Assn., June 3, 1922, 78, No. 22, 1680-1682.—As a member of the Department of Hygiene of Harvard College the author has been interested in the question of functional heart murmurs.

In 1919 to 1920 it was found that of eighty-four men entering athletic competition about 10 per cent. had functional murmurs in the pulmonic area. The murmur was systolic in time, not transmitted, and usually heard loudest in the recumbent posi-

tion. "All men were subjected to the following test. The heart sounds were auscultated with the subjects in an erect position with the breath exhaled for perhaps twenty seconds. The same was done with the subjects in a recumbent position. The 10 per cent. mentioned above, or eight men who already had such murmurs, showed a definite increase in the volume of sound by reason of this procedure. Twenty-five, or 30 per cent. of the eighty-four men, were found to have no murmurs of any sort under these conditions. The remaining fifty-one men, about 60 per cent. of the men examined, showed a definite murmur, systolic in time, in the pulmonic area. This made fifty-nine men, or 70 per cent. of those examined in this manner, who had a systolic murmur. No apical or precordial murmurs could be produced by this method, the pulmonic area being the only place where any could be heard. In all cases this artificially produced murmur was loudest in the recumbent position."

In 1920 to 1921 similar examinations were carried out for 506 men comprising all candidates for athletic teams in the University. Ten per cent. of these men had murmurs on the first auscultation, and in 56 per cent. a murmur was brought out by the procedure described above. The individuals so detected were kept under observation, but not restricted in activity. The results of this management are indicated in the author's conclusions.

1. The systolic murmur in the pulmonic area, even in an individual with unstable blood pressure and other signs which might disturb a physician, is a physiologic phenomenon which is yet to be explained.

2. Such murmurs need not bar men of the college age from strenuous exercise under some strain.

3. Exercise under these conditions has seemed to improve rather than harm the health of these men, and has served at the same time to demonstrate that they are not quite so efficient physically as those without demonstrable or producible murmurs.

4. The consideration of these murmurs may be a step toward determining in advance a man's functional efficiency in meeting competition, not only in athletics, but perhaps in life in general.—C. K. Drinker.

THE HEART IN TUBERCULOSIS. *G. A. Stephens.* Tubercle, Oct., 1922, 4, No. 1, 7-13.—While discussing the immediate subject of his paper, the author puts forward the suggestion that the "pulse-heart time ratio" gives some indication of the reserve power of the heart. His observations were made on men employed before furnaces, and he holds that the nearer the pulse beat is to the first sound of the heart, the more *useful* is the heart. The point is also made that for a heart to beat more quickly during heavy labor, the pericardial fluid which lubricates its surface should increase in amount. The ideas seem suggestive but they are not clearly or fully expounded.—E. L. Collis.

THE INCOMPETENT HEART AND INDUSTRIAL ACCIDENT. *William H. Holmes.* Nation's Health, March 15, 1922, 4, No. 3, 160-162.—The wide latitude of reaction possessed by the normal heart and the readiness with which it recuperates from fatigue leads to the belief that fatigue alone does not cause failure of a normal heart; the diseased heart may show signs of decompensation following causes which may appear trivial. The discovery of cardiac disease need not debar a man from employment, but should constitute a reason for placing him in a position where this disability will not be increased.

Despite the numerous ways in which trauma may affect a heart, the common causes of cardiac disease must be sought elsewhere. Injury may act as a contributing cause of cardiac failure in the presence of known cardiac failure. A negative history is of no value in determining whether disease existed prior to the trauma. A positive history revealing symptoms of rheumatism, chorea, etc., on the other hand, may be extremely suggestive of preexisting cardiac disease. Certain pathological conditions must be definitely excluded before attributing cardiac disease to an accident.—L. A. Shaw.

MENTAL

FEEBLE-MINDED WOMEN IN NEW YORK INDUSTRIES. *Edith Hilles.* Nation's Health, May 15, 1922, 4, No. 5, 287-289.—The introduction of the feebleminded into industry must be considered from the standpoint of the welfare of the workers, of those with whom they are

associated, and of the public at large. The moron is happiest when provided with agreeable and monotonous work, and experiments that are being made by a knitting mill company show that the employment of feeble-minded girls in industry under proper conditions is practical. In this case the girls live in a colony under supervision and are protected in various ways. The writer concludes, however, that it is a grave question whether the state should adopt a permanent policy of placing workers, known to be subnormal, in private industries to compete with a supposedly normal group.—G. E. Partridge.

THE PROBLEM OF THE MENTAL MISFIT IN INDUSTRY. *George K. Pratt.* Ment. Hyg., July, 1922, 6, No. 3, 526-538.—The work of the neuropsychiatric corps in the late war is reviewed as an introduction to similar work that might well be incorporated in the mental hygiene of industry. In the army examinations men were selected for the first time in the history of the world for qualities other than a sturdy physique and a strong right arm. In other words, the intellectual and emotional factors were considered equally important. The success of this application of psychiatry to choosing soldiers is now well known.

The mental misfit in industry may create as much of a problem as in the army. The important point is to look on workers as individuals, not to lump them as man-power. Modern industry should not look upon its personnel as so many "hands," but as so many hands plus minds, nerves, instincts, and emotions. Individual study can be used in various ways: in the first place, subnormal individuals can be picked out and put at work for which they are well fitted. There are certain jobs at which they do better than people of superior intellect, for example, the monotonous running of automatic machines in large factories.

A more difficult problem is that of the psychoneurotics. These are people with poorly balanced emotional equipments, and vary from men who are merely "touchy," to those agitators and chronic "kickers" who border on being psychotic.

The problem of the development of psychoses among men already employed is discussed, as, for example, general paresis, premature arteriosclerosis, and dementia praecox. It is pointed out that in order to avoid dissatisfaction and friction we must not only weed out these pathological employees but also place the normal workmen properly, so that they will not develop unrest and resentment.—Stanley Cobb.

RESPIRATORY SYSTEM

PULMONARY ASPIRATION OF PARTICULATE MATTER, NORMALLY AND DURING ANESTHESIA. *H. J. Corper.* Jour. Am. Med. Assn., June 17, 1922, 78, No. 24, 1858-1862.—The author summarizes this article as follows:

The immediate intrapulmonary distribution of inhaled particulate matter (smoke or soot) differs from that of the inspiration or aspiration of particulate matter suspended in fluids (India ink). The former is found heaped up at the points of bifurcation of the air passages or on any prominent projections, as seen in the histologic sections, with relatively little being retained in the alveoli; while the inspired fluid quickly reaches the alveoli, where the insoluble particles of it are retained for a comparatively long time by the trap-like action of these terminal air vesicles. While the inhaled particles are fairly uniformly distributed throughout the entire lung, the inspired or aspirated fluid is irregularly distributed, and its location is determined to a great extent by posture. The pulmonary inspiration or aspiration of fluids after nose instillation occurs readily in dogs and rabbits under ether anesthesia, and in the horizontal posture with the head slightly elevated. The inspired fluid is confined to the upper lobes of the lungs and to the side on which the animal lay, while without anesthetic, repeated nose instillations are usually unsuccessful in this posture. In the vertical posture, however, the inspiration of fluids into the lungs is easily attained in rabbits, but less so in dogs, without anesthetic, the fluid being found mainly in the lower lobes. The postural distribution can be imitated in an artificial chest, indicating that it is determined by mechanical means, gravity and inspiration or aspiration. By utilizing the postural data, right or left side upper lobe pulmonary tuberculosis, possessing many of the characteristics of the disease in man as to location, the formation of pleural adhesions, tissue granulation and necrosis, can be

reproduced in dogs, by the nasal instillation of suspensions of tubercle bacilli while the animal is under ether anesthesia and lying on the right or the left side during the operation.—K. R. Drinker.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

Blood Transfusion in Illuminating Gas Poisoning. Jour. Am. Med. Assn., June 24, 1922, 78, No. 25, 1977.—Dr. de Harven recently presented to the Société Clinique des Hôpitaux de Bruxelles an interesting case of carbon monoxide poisoning cured by blood transfusion. The patient was in a serious condition and the intoxication was characterized by convulsions occurring every ten minutes, superficial respiration, impalpable pulse, and hazy cornea. There was no resorption after injection of a considerable quantity of saline with epinephrine. Three hundred and fifty cubic centimeters of blood were withdrawn from the radial artery and a transfusion of citrated blood was performed. The effect was excellent. The pulse became palpable; the arterial pressure rose, and the next day it was normal. The following day, the patient was conscious.—K. R. Drinker.

Effects of Intratracheal Medication on Gas Burns of the Respiratory Tract. *Lafayette Page.* Jour. Am. Med. Assn., July 22, 1922, 79, No. 4, 259-261.—This article is summarized by the author as follows:

1. Intratracheal medication is clearly indicated in all forms of inflammation of the lower respiratory tract resulting from the caustic action of poison gases. It should be used as early as possible after gassing, for the purpose of relieving the first symptoms of pain and asphyxia and reducing the extent of secondary infection, by facilitating drainage of the trachea and bronchi and rendering the passages as sterile as possible, through the antiseptic properties of the oil solutions.

2. This method of treatment shortens the process of suppuration in the secondary stage by aiding the lung reflexes, in expelling the necrotic membranes and products of inflammation, and in healing the ulcerated surfaces, thus relieving the strain on the nerve centers and checking the cough and spasmodic efforts to expel the débris; and thus improving oxidation, diminishing toxic absorption and affording rest to the whole organism.

3. Through shortening the healing process, the permanent damage to the pulmonary mechanism is lessened, there is less surface denuded of epithelium, less scar formation, less peribronchial thickening and, consequently, less tendency to chronic bronchitis and predisposition to tuberculous infection.

4. We are convinced from our observations and experience in using this treatment, before, during and since the war, that all forms of laryngitis, bronchitis, bronchiectasis and asthma, with all the different kinds of distressing coughs and spasms associated with these affections, are more quickly and effectually relieved by this form of treatment, and its use is urged in this class of disorders.

The Effect of Gasoline Fumes on Dispensary Attendance and Output in a Group of Workers. *Octavius M. Spencer.* U. S. Pub. Health Ser., Pub. Health Rep., Sept. 22, 1922, 37, No. 38, 2291-2307.—A thorough survey is reported of the working conditions of twenty-two persons operating coupon-cancelling machines. The operators showed a very high dispensary attendance rate in comparison with a control group. This was due to exposure to fumes of gasoline used in cleaning stamps and belts in the cancelling machines. The poisoning from the gasoline fumes was of a mild chronic type. Substitution of kerosene perfumed with anise oil, in the place of gasoline, caused a lower sickness rate and increased production.

Two Cases of Zinc Poisoning. *R. Engelsmann.* Deutsch. med. Wchnschr., April 14, 1922, 48, No. 15, 488-489.—The first case reported was of non-industrial origin.

The second case was of a young man who had operated an oxyacetylene or oxyhydrogen torch in dismantling a ship's boiler. In cutting through the boiler plate he also had

to cut through a heavy sheet (*Zinkoxydplatte*) presumably of zinc (and not zinc oxide). The ventilation of the room was poor so that fumes from the vaporized zinc were inhaled and resulted in symptoms similar to those reported as *Giessfieber*.

Report Presented at the Superior Council of Public Hygiene of France. Rev. d'hyg., March, 1922, 44, No. 3, 255-261.—The conclusions of the report are:

The superior council of public hygiene of France decrees:

1. That, notwithstanding the vote of the International Labor Conference, the French limitations concerning the use of white lead continue to be rigorously enforced;

2. That the provisions of article 79 of the Code of Labor, concerning the prohibition of the use of white lead in the painting of ships, be extended to the painting of vehicles of all sorts.—M. C. Hamblet.

Experimental Plumbism: Therapeutic Efficiency of Some Agents and Comparative Toxicity of Other Metals. *P. J. Hanzlik, Mary McIntyre,* and *Elizabeth Presho.* Proc. Soc. Exper. Biol. and Med., Jan. 18, 1922, 19, No. 4, 192-193.—Experimental chronic lead poisoning was produced by feeding metallic lead bullets to pigeons. Death occurred in an average of twenty-one days. The lethal dose of lead was 0.16 gm. per kilo; the concentration found in the tissues was about 0.075 per cent.; and the current of lead varied between 0.01 to 0.02 gm. per kilo per day. There was a marked loss of body-weight which began at the end of from two to four days and was coincident with a marked loss of appetite.

Beneficial influence was obtained in the advance of the disease by administration of sodium iodide in the food and water, and magnesium sulphate and calcium sulphide in the food.

Lead salts and other metals were not nearly so toxic as lead itself.—J. C. Aub.

A New Case of Manganese Poisoning with Manganese Stuttering in a Worker in Manganese Dioxide. *Heinrich Embden.* Deutsch. med. Wchnschr., April 7, 1922, 48, No. 14, 472.—Since the discovery by Embden (1902) of manganese poisoning in workers in manganese dioxide, health regulations promulgated by the police have caused manganese poisoning to disappear in Hamburg. The new case now reported occurred in a 46-year-old man, who had ground manganese dioxide since 1914. From 1915 to 1919 there was an interval when he was an infantryman in the war. Since then he has been busy at his trade. Until three months ago he was entirely healthy. Recently, instead of the South Russian ore which is no longer accessible, the much harder and more dirty Brazilian ore has been ground.

His illness began about eight weeks ago. The first symptom was stuttering. Then came tremor of the hands, characteristic "action tremor," especially when his hands were reaching up (washing his face). Then walking became more difficult. There is now no vertigo, no headache, no retropulsion or propulsion. He can write only very badly. There is no irresistible laughing. There is weakness of movement, especially mimicking movements. The occurrence of stuttering as an organic symptom (as is the case in chronic mercurial poisoning) brings forward the idea that among genuine stutterers, whom we are accustomed to regard as neurotics, there are perhaps concealed a few organic cases. Whether or not manganese stuttering is a lenticular nucleus symptom, further observation must show.—K. R. Drinker.

Morbid Disturbances Due to the Handling of Celluloid. Jour. Am. Med. Assn., July 8, 1922, 79, No. 2, 146.—Dr. F. Heim, professor of industrial hygiene of the Conservatoire National des Arts et Métiers, with the collaboration of Dr. E. Agasse-Lafont and Dr. A. Feil, examined, from a clinical and hematologic standpoint, women employed in making small portable battery boxes of celluloid. They employed two substances: celluloid powder, containing camphor, and very inflammable; and a sort of glue containing a mixture of equal parts of amyl acetate and acetone. The inquiry revealed one transitory clinical sign, headache, and a persistent and frequent hematologic symptom, eosinophilia. This cause of toxic eosinophilia is important; it resembles somewhat benzene eosinophilia. This eosinophilia is interesting because it gives an almost indubitable proof of intoxication or, at least,

of a reaction to saturation of the organism by fumes of acetone and of amyl acetate. On the other hand, the lack of knowledge of this cause of eosinophilia might entail errors in diagnosis, as when a workman handling celluloid is clinically suspected of intestinal parasites or hydatid cyst, as the diagnosis of these affections is often based on the finding of eosinophilia.—K. R. Drinker.

QUININE SICKNESS OF OCCUPATIONAL ORIGIN. *Blamoutier* and *Joannon*. Rev. d'hyg., June, 1922, 44, No. 6, 521-532.—The author presents the report of a case of quinine poisoning which appeared in a man who worked in a chemical establishment preparing the drug. After two weeks' employment at various processes, including the handling of quinine bark and of powdered bark, and at the process whereby quinine sulphate is produced, edema of the eyelids was noted. Subsequently an itching erythematous eruption involved the face, neck, antecubital spaces, genitalia, and the upper third of the inner aspects of the thighs, associated with some edema and, on the face, with vesiculation.

The blood showed a positive Wassermann reaction, a leukocytosis (18,000), and an eosinophilia (23 per cent.).

Under treatment with moist dressings of eau d'Alibour, with silver nitrate, zinc ointment and ichthyol, and given a mild diet, the patient improved.

The authors discuss the question of immunity and susceptibility to quinine and that of the eruption being of external or internal origin. They are of the opinion that cases of this nature are not essentially different from those originating in the ingestion of quinine therapeutically administered. It was possible in the factory visited to inhale and swallow quinine dust. There are presented certain observations regarding a skin reaction to quinine of possible value in identifying susceptible individuals. A bibliography is appended.—Wade Wright.

DUST HAZARDS AND THEIR EFFECTS

THE FELD SCRUBBER FOR CLEANING METALLURGICAL SMOKE. *W. F. Lamoreaux*. Engin. and Mining Jour., 1922, 113, 198.—This article contains a detailed account of large scale operations in the recovery of fume from a copper smelter, the primary object being the removal of solids from the fume so that the sulphur dioxide gas remaining can be used as a source of elemental sulphur, and recovered zinc oxide can be used for electrolytic zinc.

From the point of view of industrial hygiene the article is of special interest because of the author's clear, concise exposition of the wetting of the fine fume particles, and the failure of bag filters, coke filters, and Cottrell precipitators to function on a practical scale. Fume recovered by the Cottrell precipitators could not be wetted, except by previous vigorous heating, because of a film of absorbed sulphur dioxide gas.

With the Feld scrubber an efficiency of 95 per cent. was attained in the removal of the fume. The cleaned gases were then passed through incandescent coke, thus reducing the sulphur dioxide to sulphur in the gaseous state. To recover the sulphur from this operation a second Feld scrubber was installed which combined a convenient means of regulating the temperature and a method of collecting the sulphur. To show the difficulty in wetting this sulphur fume the author states that it sometimes was in such a fine state of division that it could be passed through eight thicknesses of closely woven handkerchief linen.

A theoretical discussion of electrical charges on the fume and water particles, the number of contacts between the fume and water, and the effects of valency and electrical charges on the ability of finely divided solids to absorb moisture are discussed.—Philip Drinker.

THE INDUSTRIAL TREATMENT OF FUMES AND DUSTY GASES. *W. E. Gibbs*. Jour. Soc. Chem. Indust., June 30, 1922, 41, No. 12, 189T-196T.—The subject is treated from the standpoint of colloid chemistry in which smokes, fumes, and dusty gases are regarded

as the disperse systems in which the dispersed substance is solid or liquid, and the dispersion medium air or other gases.

It is shown that settling from air or gases in motion can be effected only in the case of particles larger than 10^{-3} cm. in diameter. Considering particles as spheres the author distinguishes three kinds of disperse systems: (*a*) dusts, having particles larger than 10^{-3} cm., which settle with increasing velocity in still air and do not diffuse; (*b*) clouds, having particles ranging in diameter from 10^{-3} to 10^{-5} cm., which settle at a constant velocity in still air according to Stokes' law but do not diffuse; and (*c*) smokes, having particles ranging from 10^{-5} to 10^{-7} cm. in diameter, which do not settle at all in still air but diffuse fairly rapidly.

Various common methods of separation of gas particles by settling are discussed. An excellent discussion of flocculation is included. Bag filtration is treated in the conventional manner. In washing methods, the ability of particles of sulphur trioxide and zinc oxide to absorb moisture is discussed in the light of the present-day theory of an adsorbed film of gas around the particle. Electrostatic precipitation is treated from the standpoint of experience with the Cottrell precipitator.

A bibliography of thirty-six references is included in the paper.—Philip Drinker.

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

Occupational Influences in Tuberculosis Rates. *I. A. Galdston.* Nation's Health, April 15, 1922, 4, No. 4, 226-227.—In the last ten years in New York City tuberculosis has been essentially a man's disease, the male mortality being twice as high as that for women. The reason for this is that the great majority of trades which predispose to tuberculosis are followed, almost exclusively, by men.

Since conditions in industry are often the cause of the development of tuberculosis in the individual, the education formerly attempted in the home and in the school must now be taken to the workshop and factory, the office, the union meeting, and the apprentice school. The economist and sociologist can do his part in reducing the mortality from tuberculosis by efforts to shorten the hours of work, to increase wages to a living standard, and to lighten the fatigue of hard labor.—K. R. Drinker.

Tuberculosis as an Occupational Disease. *Robert T. Legge.* Nation's Health, June 15, 1922, 4, No. 6, 363-364.—In a recent number of the London *Lancet* Professor Benjamin Moore is said to have shown, in an article entitled "Factory Conditions and Phthisis in Great Britain," that urban employment as distinct from urban housing conduces to increase the prevalence of phthisis. It was found that up to the age of 20 both urban males and rural males are healthier than females, and in the case of both sexes urban dwellers are healthier than those in the rural districts; that up to the age of 14 or 15, coincident with the usual beginning of employment in industry, the mortality of females is 50 per cent. greater than that of males; that there is more tuberculosis among males than among females in the cities, the reverse being the case in the country.

Tuberculosis in industry usually follows after a long period of exposure to debilitating conditions. The primary factors are overstrain, unhealthful surroundings, and close contact with operators already infected. In the dusty trades dust is the most important factor; metallic, mineral, vegetable, and animal dusts are all bad. Other factors are the dangerous irritating and toxic fumes, excessive humidity, dampness, extreme heat, cold and darkness. Fatigue due to strain and overwork, and alcoholism increase the risk of infection. Faulty posture, overcrowding, poor ventilation, improper food, and lack of proper rest are all contributing factors to the disease.

The relation of tuberculosis to occupational conditions is definite, and it can be said that occupation is preeminently at fault. The greatest weapon possessed by society in the prevention of the disease is education. The public health nurse is a teacher in health

education, and it will be a happy day when every precinct has a public health nurse who has made a survey of her district.

Another important advancement made in recent years is the extension of nutrition work into industry. The benefits derived from the industrial restaurant have a direct influence in lessening tuberculosis by providing clean wholesome food, properly prepared, and by affording relief of fatigue by relaxation and change of air. The public health center will evolve into a greater and more adequate service for community needs and requirements. Tuberculosis as an industrial disease must be charged to the employer, as far as the necessary means of prevention are neglected. Industrial responsibility does not end with the provision of mechanical exhaust, heating, and ventilating apparatus, but must extend to general interest in providing means of maintaining health.—G. E. Partridge.

Peptone in the Treatment of Anthrax. Jour. Am. Med. Assn., Aug. 26, 1922, 79, No. 9, 755.—Drs. R. F. Vaccarezza, F. F. Inda, and R. Posse have published a paper on the treatment of human anthrax based on their experience in the infectious disease clinic of the school of medicine in Buenos Aires. They treated 204 diseases: fifty-six with anti-anthrax serum Méndez, with a death rate of 19.6 per cent.; ninety-four cases with this serum plus other medication, with a death rate of 20.2 per cent.; twenty-four cases with anti-anthrax bovine serum, with a death rate of 8.3 per cent.; thirty cases with anti-anthrax bovine serum plus other medication, with a death rate of 13.3 per cent.; fifteen cases with normal bovine serum, with a death rate of 20 per cent.; twenty-four cases with normal bovine serum plus other medication, with a death rate of 16.6 per cent.; and fifty-nine cases with peptone alone, with a death rate of 6.67 per cent. The average mortality was 15.8 per cent. The authors concluded that while normal serum has no action experimentally, it has shown curative powers in human anthrax. Its value is virtually equal to that of immune serums. Peptone in muscular injections (from 10 to 20 c.c. a day, 10 per cent.) showed a therapeutic potency not inferior to anthrax serum, although naturally it has no specific action.

Treatment of Anthrax. *R. F. Vaccarezza, F. F. Inda* and *R. Posse.* Abstracted as follows from Semana méd., June 1, 1922, 1, No. 22, 865, in Jour. Am. Med. Assn., Sept. 23, 1922, 79, No. 13, 1085.—This long study of hundreds of cases of anthrax treated by various methods asserts that normal beef serum proved as effectual as the specific antiserum, but that its action is merely that of protein therapy. Consequently, the beef serum can be substituted by some substance which does not sensitize, and does not induce serum sickness. Peptone seems best adapted for the purpose, and it proved so satisfactory that in the last six months it has been used exclusively in all cases, even those with septicemia. Nolf's technic is followed: an intragluteal injection once or twice a day of 30 c.c. of a 5 per cent. solution of peptone: 5 gm. of Witte's peptone with 0.5 gm. of sodium chloride in 100 gm. of distilled water. The full data of forty-three cases thus treated are appended.—K. R. Drinker.

The Anthrax Hazard in Pennsylvania Tanneries. *Henry F. Smyth.* Am. Jour. Hyg., July, 1922, 2, No. 4, 346-367.—In 1921, upon the authority of the State Department of Labor of Pennsylvania, a survey of the entire tanning industry of that state was made in order to determine the hazard from anthrax in the handling of hides and skins. It was shown that anthrax is a constant menace to workers in the receiving, soaking, and liming departments of tanneries handling cattle hide and goat skins, and that certification is no infallible protection against the disease. Anthrax was found in more than half the goat skin tanneries sampled and cases were reported in 42 per cent. of the tanneries. In cattle hide tanneries, anthrax has been found by culture in less than 7 per cent., but cases have been reported from almost 40 per cent. Dry hides were found responsible for more cases than green salted hides, and it is, therefore, recommended that if dry skins and hides continue to be imported, provision should be made for disinfecting them at one or more ports of entry by either the Schattenfroh or the Seymour-Jones method, if satisfactory to the tanners, and that the hides thus treated be shipped to the tanneries in the wet salt state.

Lime disinfectant, if used, should be with at least a 10 per cent. calcium oxide suspension from burnt lime for over twenty-four hours (a process which lessens risk but does not entirely eliminate it). The Seymour-Jones method is better than lime if it will give tannable skins, and the Schattenfroh salt and hydrochloric acid method is better than either. To diminish the liability of more or less permanent infestation of soak vats, etc., whitewash should be used on all wood, concrete or metal work about store rooms, soak rooms, etc.

Until tanneries cease to receive infected skins and hides they should be required to provide suitable wash fixtures and shower baths for their employees. Towels, overalls, and workshirts should be disinfected with formaldehyde vapor by the tanner before they are taken from the tannery. Work shoes should not be worn out of the tannery; shoes or boots of rubber and felt with wooden soles that could be disinfected would be best. A further study should be made of the proper disposal of wastes. No dry sweeping should be permitted in stock and store rooms.

The May, 1922, issue of the *Nation's Health* contains an article on this subject by the same author.—G. E. Partridge.

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

Injuries of the Eye and their Legal Adjudication. *Viktor Hankè.* Wien. klin. Wchnschr., March 2, 1922, 35, No. 9, 199-203.—Injuries due to accidents in industry are discussed and defined. Clinical features are given in detail. The eye injuries may be divided as follows:

I. Direct traumata of the eyeball.
   (*a*) Injuries due to dull objects.
   (*b*) Injuries due to sharp, pointed objects.
   (*c*) Thermal, chemical, or electrical injuries.

II. Indirect traumata.

Considerations regarding compensability of different types and degrees of eye injuries are given *in extenso.* The greatest compensation for loss of an eye is from 25 to 33 1/3 per cent. of the maximum for eye injuries. According to qualification and age, the compensation for unilateral postoperative aphakia is from 15 to 20 per cent.—B. Cohen.

INDUSTRIAL SURGERY

A Remarkable Surgical Service. Nation's Health, Feb. 15, 1922, 4, No. 2, 104-106.—A surgical service giving, through centrally located clinics, full-time free treatment to workers all over the country who sustain industrial accidents, treatment rendered by highly specialized industrial surgeons, is the aim of the Liberty Mutual Insurance Company in maintaining its chain of surgical dispensaries.

In order to induce the injured workmen to go to the clinic, the Liberty Mutual not only offers the best of treatment but free treatment is given for the entire period of disability. The aim of the medical department is to shorten the period of disability and to restore the man's earning capacity as soon as possible. It is the policy of the company to pay for the treatment which will do away with the man's disability, rather than to pay the injured man compensation for a long period.

During the last ten years treatment of injured employees has been wonderfully improved, the period of disability has been shortened, and the workmen have learned that the company's aim is their aim.

The Fundamental Principles of Orthopedic, Reconstruction and Industrial Surgery. The Real Lessons of the World War. *H. Winnett Orr.* Jour. Am. Med. Assn., July 22, 1922, 79, No. 4, 255-257.—This article discusses the lessons of value to orthopedic surgery learned from the war and the importance of their application to cripples both of society and of industry. The importance is stressed of immediate and proper splinting of fractures and of parts affected by infantile paralysis and of the

maintenance of immobilization of injured parts in proper relationship until healing occurs. We have learned, moreover, from our war experience that "there are practically no limits to the possibilities of reestablishment of the individual by the educational and training development of original compensation or vicarious functions."

Common Foot Troubles as Induced by Shoes. *Ralph B. Bettman.* Nation's Health, April 15, 1922, 4, No. 4, 194-196.—Conditions which contribute to common foot troubles are the wearing of poorly fitted socks and stockings and of rubber overshoes which interfere with the natural evaporation of moisture from the foot. The main defects of poor shoes are leather which is too impermeable, high heels, improper "shank" or instep of the shoe, pointed toes, flaring of the shoe so that an "out-toeing" effect is produced, and a purposeful twist in the last so that the foot is slightly rotated, lifting the outer margin upward and allowing the arch to drop a very small amount.

The sequelae of poor shoes are corns, bunions, calluses, and metatarsalgia. Any of these abnormal conditions causes a voluntary or an involuntary effort to spare the part of the foot involved. This means an abnormal gait, speedy fatigue, and a consequent injury to the supporting mechanism of the arches which leads to the development of "weak foot"—a term preferred by the author to that of flat foot.

If recognized early, the great majority of weak feet can be remedied by removing the cause of the abnormal action. A well-fitting and well-constructed shoe will not only prevent the conditions described, but will, in the majority of cases, cure them. The author concludes with an outline of the requirements of a properly constructed shoe.—K. R. Drinker.

INDUSTRIAL PHYSIOLOGY: NUTRITION, METABOLISM, FATIGUE, ETC.

The Effect of Industry upon Alcoholism. *Edgar L. Collis.* World's Health, July, 1922, 3, No. 7, 324-330.—This interesting paper deals with the part which modern industrial life has played, not only in creating a desire for alcoholic beverages when conditions of work are unfavorable, but also in limiting alcoholic tendencies when occupation raises the social position of the worker. The main points brought out are contained in the author's summary:

The development of modern industry saw a marked increase in the consumption of alcoholic beverages.

The regular drive of work continued for long hours, the increase in activity demanded, the custom of paying wages before rest periods, the occasional occurrence of too sudden a rise in wages, have among other things contributed to this increase.

On the other hand, improved health and wealth with general social uplift, shorter hours of toil, provision of facilities for taking food during working hours, and of facilities for personal hygiene, are all industrial influences tending to eradicate inebriety.

Food of Factory Workers in Sweden. *E. Abramson.* Abstracted as follows from Hygiea, Stockholm, May 31, 1922, 84, No. 10, 395, in Jour. Am. Med. Assn., July 22, 1922, 79, No. 4, 338.—The conditions are compared of workers who eat at home and those eating at the free common dining room supported by a certain factory owner. The calories actually consumed, the differences with age, sex and work, the expense per capita, etc., are considered. Fourteen tables give data for comparative research in this line.

Posture and Fatigue. *Theresa Wolfson.* Abstracted as follows from Survey, April 8, 1922, in Jour. Personnel Res., June, 1922, 1, No. 2, 95.—A discussion of a survey of the conditions of seating, illumination and ventilation in the ladies' garment shops in New York City. The survey was made by the Joint Board of Sanitary Control of the industry as a preliminary to the inauguration of an intensive campaign for improvement of posture. One of the most serious conditions found was the use of a motley assortment of chairs and benches ill-adapted, for

the most part, to the stature of the worker. The Board hopes to create an intelligent understanding of the seating problem in the industry and to convince employers that elimination of a great amount of fatigue through the proper handling of this problem is quite as much a matter of good business as the installation of modern machines.

Health Problems Involved in Noise and Fatigue. *Henry J. Spooner.* Nation's Health, March 15, 1922, 4, No. 3, 156-159.—Manufacturers and business men should realize that noise prevention and reduction are a paying proposition, for noise in its cumulative effects probably represents one of the most active causes of fatigue and is, therefore, a source of economic waste. The causes of sounds and noises arising in city streets, factories, and workshops, are analyzed and their remedies discussed.—L. A. Shaw.

The Year's Progress in the Reduction of Noise. *Henry J. Spooner.* Nation's Health, June 15, 1922, 4, No. 6, 368-369.—A standard limit of permissible noise, beyond which it should be considered a public nuisance, is now made practicable by recent improvements effected by A. M. Low in his audiometer. Machinery that is practically noiseless can be devised for almost every purpose. Helical gears, spiral bevel gears, etc., which if mounted on shafts of sufficient stiffness are silent running, should be used. The program should now be: (1) scientific design from the standpoint of noise, substituting pressure for impact wherever practicable; (2) accurate construction and efficient lubrication; (3) observant efficient maintenance.

The article contains a detailed description of Low's audiometer and of the new vibrometer.—G. E. Partridge.

Fatigue Effects as Measured by Sugar Content of Blood. *Buford J. Johnson.* Abstracted from Comparative Psychol., April, 1922, 2, No. 2, 155-171, in Jour. Personnel Res., July, 1922, 1, No. 3, 152.—This experiment was performed for the purpose of studying changes in the sugar content of the blood of children as related to different kinds and amounts of activity. Eight subjects, four boys and four girls (selected because of a relatively low resistance to physical fatigue and the fact that they expended a high degree of effort for such scores as they obtained in their psycho-physical examination) were used throughout the experiment.

Tests for co-ordination, discrimination, memory for digits, and substitution were made. It was impossible to get definite standards as to the normal sugar content of blood for the ages considered because of the variability found in the same individuals in the preliminary examinations. The results obtained after the test series also showed a high degree of variability. A child might show a relatively high sugar content before exercise and then either a slight or marked increase or even a slight decrease after exercise. The author believes that, although conclusions as to the influence of the kinds and amounts of activities upon the sugar content of the blood would be unwarranted by the data, the experiment indicates, nevertheless, a method of investigation that may clarify the concepts of fatigue and lead to a reformulation of the factors involved in fatigue effects.

WOMEN AND CHILDREN IN INDUSTRY

The Problem of the Working Mother. *A. Louise McIlroy.* Nation's Health, March 15, 1922, 4, No. 3, 132-135.—According to the Sex Disability Act, a woman must not be penalized because of her sex. As long as a woman does her work satisfactorily her private life should be just as little the concern of her employer as that of a man. Notwithstanding this act and the morale which it implies, there is a tendency in England today to debar women from employment upon marriage. In dismissing married women from work the industries must lose many highly skilled laborers, and at the same time destroy the incentive of women workers as a whole to become skilled laborers. The injustice and hardship brought about by dismissal in the face of economic stress and financial difficulties may be very severe. The strain and anxiety involved in making ends meet may be

just bearable if a woman can retain her profession or trade.

During pregnancy, work, if not harmful in its effects, should be continued. In the event that full-time work seems to be detrimental, then the work must be graded to meet the temporarily reduced capacity. Reduced remuneration should be supplemented by a maternity endowment fund contributed by the state.—L. A. Shaw.

Occupations of Children. Fourteenth Census of the United States Population: 1920. U. S. Dept. Commerce, Bur. Census, 1922.—The total number of children from 10 to 15 years of age engaged in gainful occupations in the United States was, in 1920, 1,060,858, comprising 714,248 boys and 346,610 girls. The boys reported as gainfully occupied constituted 11.3 per cent. of the total of 6,294,985 boys aged from 10 to 15 years, and the girls 5.6 per cent. of the 6,207,597 girls within the same age limits. The total number of children gainfully occupied was only slightly more than half as large in 1920 as in 1910, the decrease being 46.7 per cent. The gainfully occupied children reported as engaged in agriculture, forestry and animal husbandry numbered 647,309, and those employed in manufacturing and mechanical industries, 185,337. These two groups constituted 61 and 17.5 per cent., respectively, and together embraced nearly four-fifths of the total number of gainfully occupied children. The textile industries employed 54,649 children, or nearly three-tenths of the total number reported for manufacturing and mechanical industries generally.—K. R. Drinker.

INDUSTRIAL MEDICAL SERVICE: MEDICAL DISPENSARIES AND HOSPITALS IN INDUSTRIAL PLANTS

The Scope of Industrial Medicine. *D. Glen Smith.* Indust. Management, June, 1922, 63, No. 6, 370.—The writer thinks that the practice of industrial medicine includes seven chief functions: pre-employment physical and mental examination; periodic examination of employees; the activities of the hospital or dispensary; the prevention of occupational diseases and of infectious and contagious diseases; the sanitary and hygienic supervision of the plant; educational activities, and research.

The pre-employment examination properly separates men into three classes: those who prove to be mentally and physically fitted for any employment they choose or can obtain; those who must be placed subject to certain limitations; those physically or mentally unfit for any employment.

Emergency hospitals, where accidents and acute illnesses of all kinds are given only first treatment, waste space and money, and they should be replaced by the complete and well-equipped dispensary service. The industrial dispensary should be equipped for the proper diagnosis and treatment of all minor and ambulatory surgical accident cases of company responsibility and of all minor surgical and medical cases of personal responsibility in order that employees may be kept at their work until they can conveniently consult private physicians; and for the purpose of securing records of facts for protection against these personal conditions, which occasionally are brought forward as claims.

Ninety per cent. of the activities of industrial medicine are aimed at prevention, and every industrial medical service should develop a satisfactory system of guarding employees against diseases as well as accidents.

Keeping the Human Machinery off the Scrap Pile. *Edward S. Cowdrick.* Indust. Management, June, 1922, 63, No. 6, 324-325.—The writer argues that it is as important to industry to conserve the human factor as it is to conserve machinery. The physical condition of a worker and the factors that affect it are proper subjects for close consideration.

Health conservation, as here discussed, starts with the physical examination. Thorough examinations at stated intervals—conducted by competent internists—and carefully recorded findings are essential. Purely physical ailments may produce mental or temperamental lapses which may be very costly to industry. A high salaried executive may pass months during which, on account of a loss of physical or mental vigor, his services are worth only a fraction of what they cost.

The necessity of understanding and conserving the physical and mental health of men is, therefore, apparent if such loss is to be avoided.—G. E. Partridge.

Medical Services Available for Natives on the Rand Mines. *M. M. Pam.* Lancet, June 10, 1922, 202, No. 5,154, 1,174-1,175.—The account given of medical services available for natives on the Rand Mines borders on the ideal, an ideal seldom attainable. Natives, recruited from their villages, undergo not only thorough medical examination upon reaching Johannesburg, but they are treated for vermin, their heads and bodies are shaved, and their clothes are baked. They are given pneumococcal vaccine and are weighed at the time of employment and every succeeding month. Medical officers are attached to each mine or group of mines; there are dressing stations with attendants in charge; ambulances connect with central hospitals of two hundred or more beds. These hospitals have ample opportunity for bacteriological and chemical work with the South African Institute for Medical Research.

The nursing is carried out by trained white matrons and sisters, with colored probationers; when the latter are well trained they perform routine work excellently. Native "boys" act as ward attendants, orderlies, and interpreters. On returning home, patients who have not fully recovered pass to the care of the medical officer at the nearest recruiting station.

The organization is effective in action as well as on paper, and on the whole, the mining natives on the Rand are well cared for and treated.—E. L. Collis.

Cooperative Medical Aid for Injured Workmen. *Homer D. Dudley.* Nation's Health, April 15, 1922, 4, No. 4, 231-233.—The Industrial Service Bureau of the Kings County (Washington) Medical Society was organized to co-ordinate two plans devised for rendering relief to injured workmen under the Medical Aid Act: one plan permitting industrial plants to enter into contract with individual physicians to furnish medical service; the other plan giving the injured employee the free service of a physician. This bureau, backed by the medical society, makes contracts with employers to render medical and surgical service, discharges its obligations to injured workmen satisfactorily, permitting them free choice of a physician if they desire it, and at the same time apportions the work fairly among the members of the society.

The following is a brief summary of the service which the bureau renders: (1) A twenty-four hour service through a telephone exchange with five trunk lines employing three operators; (2) a choice of any physician from the bureau's list of doctors classified as to their specialties; (3) in the event that the doctor chosen is not immediately available, an emergency service is furnished and the physician selected by the injured workman subsequently takes charge of the case; if no preference is expressed, the bureau furnishes a doctor from a rotating list of physicians who have agreed to be on call for that day; (4) a fully equipped first-aid station with a graduate nurse in charge in each plant or neighboring group of plants employing 1,000 or more workmen; (5) consultation is furnished in all serious cases, consultation when requested, and consultation covering the various specialties whenever indicated; (6) first-aid cabinets with free lectures weekly to designated first-aid men in the various industrial plants; (7) free ambulance and hospital care when needed; (8) private nurses and private hospital rooms in serious cases when advised by the attending physician.—K. R. Drinker.

Value of Comparative Records in Industry. *Robert E. Andrews.* Nation's Health, June 15, 1922, 4, No. 6, 361-362.—There appear to be as yet no accepted standards by which the medical departments of two establishments working along similar lines may classify their risks, accidents, illnesses, lost time, and industrial hazards. The motive for carrying on surveys has been selfish, with little or no thought about the help which they might bring to industry in general, or even to their type of industry in particular. Standardization in keeping and publishing results is necessary, for, in order to obtain the greatest value from medical investigations, it is essential to compare them with others.

The writer has been developing a tentative plan for such standardization of records, using the International List of Causes of Death, making analysis by the Hollerith punch card and by a punch card of the Findex System. A sample card is displayed, and the code is given for disease classification, accident causes, accident types, occupation, nationality, sex status, and absenteeism.

INDUSTRIAL PSYCHOLOGY AND INDUSTRIAL MANAGEMENT IN ITS HEALTH RELATIONS

The "Psychosis" of Industry. *Frank M. Harris.* Indust. Management, July, 1922, 64, No. 1, 18-23.—The writer thinks the principles of psycho-analysis may be applied to the urgent problems arising from the present industrial conflict. A state of mental ill-health exists in the collective mind of industry, and this psychosis is the result of a conflict between wish and fact. There are thwarted desires on the part of both labor and capital that require repeated repression, resulting in dejection and discontent which lower the resistance of the industrial body and increase its susceptibility to various kinds of attack.

The cure is to be found in co-operative ownership which substitutes parallelism of interest for opposition of interest. Co-operative ownership replaces the inherent feeling of drudgery with personal enthusiasm for the work; and replaces the contention for collective bargaining of employees with the collective ballot-power of the employee stock-holder. Co-operative ownership, however, is not a system that must be rejected or accepted intact. It is a movement toward an ideal—a movement toward individualizing and humanizing industry.—G. E. Partridge.

Tests for Clerical Occupations. *Cyril Burt.* Jour. Nat. Inst. Indust. Psychol., 1922, 1, 79-81.—The author applied a number of tests to a small group of experienced and intelligent shorthand typists, and correlated the rank obtained in the tests with that supplied by the supervisor: (1) for general office efficiency, (2) for efficiency in typewriting, and (3) for efficiency in shorthand. The correlation coefficients were high, that between general office efficiency, as estimated by the supervisor, and the order for general intelligence, as indicated by the tests, being 0.79. The shorthand test yielded the same coefficient, but that for typing was only 0.60. As the result of comparing the tests, it appeared that mixed sentences, opposites, and completion were better tests of general efficiency than definitions, synonyms, analogies, and spelling.

The typists were sorted into four groups, termed excellent, good, tolerable, and failures, and by determining the marks obtained by each group in the tests, standards of efficiency were obtained.—H. M. Vernon.

What Is Personnel Research? *Robert M. Yerkes.* Jour. Personnel Res., June, 1922, 1, No. 2, 56-63.—Personnel research is the study, by scientific methods, of man in relation to the trades, arts, and professions. Only recently has attention been directed to this problem, as the idea of increasing efficiency through the mechanization of industrial operations has been carried into the sphere of human labor, while at the same time labor under the process of mechanization has become more and more self-conscious and defensive, thus causing mutual suspicion and dislike on the part of employer and laborer. There emerges slowly in this situation the belief that personnel research may point the way to adjustment or to a better system.

The proper unit of industry is the person, not the machine; the principal aspects of man in this capacity are three: physical, mental, and moral. Personnel research must be concerned with all available methods of studying these qualities and relations of men. Personnel research has to do also with the hygiene of occupational and personal life, with occupational diseases, with the health, vitality, safety, and comfort of the worker.

In regard to investigation of mentality, there are two groups of mental measurements that are especially important: measurements of intelligence, and measurements of temperament and emotional traits. Much has already been done in the study of the rela-

tions of the body of the worker to industrial demands, and now the mental aspects of the worker's nature are being considered. But there is more than that: the person may be misplaced in choosing a vocation because of lack of character and moral constitution, so there is urgent demand for the measurement of other aspects of mind than the intellectual.

There are also three essential categories of value as of personal traits: the material, the mental and the spiritual. Industrial life must be made to provide for the development of every personality in respect to all values.

FORMS, RECORDS, AND REPORTS IN PERSONNEL ADMINISTRATION. *C. N. Hitchcock.* Univ. Chicago Press, 1922, pp. 128.—The purposes of this collection of forms and records are two: to suggest the type of data in the field of industrial relations which the management of a business should have at its disposal, the records necessary for their collection, and some possible methods of presenting them for administrative use; and to illustrate the normal daily routine procedure of a personnel department.

THE MEDICAL ASPECTS OF PERSONNEL WORK. *Robert E. Andrews.* Nation's Health, April 15, 1922, 4, No. 4, 228-230.—Proper correlation of the medical and the employment departments is of great assistance in solving many of the placement problems which arise in an industry. Each new employee should be given a physical rating by a qualified industrial physician, and the data in regard to him turned over to the employment manager. In this way three sources of danger are eliminated: danger to the worker himself through fainting or epileptic seizures in the neighborhood of moving machinery; danger to other workers from contagion; and, lastly, danger to property from the mental unbalance of a worker.

The problem of the pregnant woman is an extremely important one in certain industries. In the textile shops of the Ludlow Manufacturing Associates, for example, more than 10 per cent. of the "help left" during a year are obstetrical cases. The industrial physician should be the employment manager's right hand in determining whether pregnant women are harming themselves and are slowing production by being kept too long on the job, and also whether, as efficient workers, they are physically ready to return to work when they reappear after confinement, seeking their old jobs.

The medical and employment departments can advantageously co-operate with each other in handling such problems as the betterment of industrial relations, the placement of the industrial cripple and of minors at suitable work, the treatment of requests for transfer because of fancied grievances, the employment of widows with dependents, the finding of temporary jobs for convalescents, and the handling of phobias and of psychological conditions arising from monotonous work.—K. R. Drinker.

A TEST FOR USE IN THE SELECTION OF STENOGRAPHERS. *M. A. Bills.* Abstracted from Jour. Applied Psychol., Dec., 1921, 5, No. 4, in Jour. Personnel Res., June, 1922, 1, No. 2, 92.—This reports further work with tests for stenographers and checks results given in a former issue of the *Journal of Applied Psychology.* Test VI, an intelligence test devised by the Bureau of Personnel Research, gives a critical score of 60, that is, those scoring below 60 are failures. To check the results, the test was given to two other groups, confirming the conclusion that the placing of the critical score was correct.

INDUSTRIAL SERVICE AND MUTUAL BENEFIT ASSOCIATIONS

MAKING HAPPINESS A BY-PRODUCT OF INDUSTRY. *George W. Hanley.* Indust. Management, May, 1922, 63, No. 5, 287-291.—The whole personnel of the American Rolling Mill Company in Middletown, Ohio, is organized into an association, the members of which work together to promote everyone's happiness. The association is governed by a board of directors elected by popular vote from diff rent departments of the mill. It has purchased and equipped a large building for use as a clubhouse and it maintains athletic

grounds, etc. A band has been organized and trained to a high degree of skill, and the association also has an orchestra and chorus. Public concerts are given; there are entertainments, dances, athletic contests; and many other club acitivities are carried on.

ADVANTAGES OF A MODEL INDUSTRIAL CAFETERIA. *Lee K. Frankel.* Nation's Health, April 15, 1922, 4, No. 4, 219-221.—This article describes in detail the working organization of the cafeteria of the Metropolitan Life Insurance Company in New York City, a cafeteria in which over 6,000 employees are served daily with a free table d'hote luncheon.—K. R. Drinker.

A NEW KIND OF FACTORY VACATION PLAN. Abstracted from Labor Forecast (Babson's), July, 1922, in Factory, Sept., 1922, 29, No. 3, 304, 306.—The American Multigraph Company of Cleveland installed a plan of employee representation patterned on the United States Government, in which the officers of the company formed the Cabinet, the department heads a body called the Senate, and the bulk of the employees the House of Representatives. The two latter bodies together made up the Congress. This Congress formulated a vacation plan which is used by the company.

Vacation periods are based upon length of service in the company; an employee who has worked for five years or more is given a vacation of two weeks; an employee who has worked at least two years, one week. If an employee uses his vacation period for any other purpose than that of taking a vacation, measures are taken to penalize him for this breach of the vacation arrangement.

INDUSTRIAL HEALTH LEGISLATION: COURT DECISIONS: WORKMEN'S COMPENSATION AND INSURANCE

LABOUR LEGISLATION ARISING OUT OF THE INTERNATIONAL LABOUR CONFERENCE. Internat. Labour Office, Official Bull., Aug. 9, 1922, 6, No. 6, 253-289.—A summary is presented of the measures taken to give effect to the Draft Conventions and Recommendations adopted by the 1919, 1920, and 1921 sessions of the International Labour Conference.—M. C. Shorley.

NEW YORK LABOR LAWS ENACTED IN 1922. New York State, Dept. Labor, Special Bull., No. 111, May, 1922, pp. 38.—This pamphlet contains New York Labor Laws for 1922 pertaining to public safety, and hygiene; workmen's compensation; court jurisdiction of offenses; woman, child, prison, and hospital labor; and railroad and public employees.

THE PROTECTION OF BLIND WORKERS. Internat. Labour Office, Official Bull., May 24, 1922, 5, Nos. 20-21, 2-8.—The International Labour Office presented to the General Conference on the Freedom of Communications and Transit, held at Barcelona, a request for an international agreement concerning facilities for travelling for the blind.

It was recommended that national administration of transportation services should jointly give special consideration to the position of the blind travelling in the exercise of their vocation, and that they should particularly consider the possibility of authorizing blind workers thus travelling to be accompanied by a guide without having to pay two fares.

A questionnaire was issued; and reports were given from twenty-four countries showing that at present there is a wide variety of practices, from total lack of special privileges to blind persons, as in Greece, Japan, and Lithuania, to liberal provisions for them such as are made in Australia, France, and several other countries.—G. E. Partridge.

WORKMEN'S COMPENSATION. U. S. Bur. Labor Statis., Month. Labor Rev., June, 1922, 14, No. 6, 156-159.—This is a brief report regarding workmen's compensation from four states: Indiana, North Dakota, Pennsylvania, and Virginia. A summary of accident statistics is given and of the payments in compensation. Indiana reports 263 fatal accidents during the year 1920-1921, Pennsylvania 1,924, Virginia 144. The total number of accidents in Pennsylvania from January, 1916, to the end of 1921 is given as 1,136,060, of which 16,166 were fatal and 410,193 serious.

SPIROCHETAL JAUNDICE AND WORKMEN'S COMPENSATION. *J. Shürer.* Abstracted as follows from Med. Klin., April 23, 1922, 18, No. 17, 533, in Jour. Am. Med. Assn., July 1, 1922, 79, No. 1, 85.—The man of 62 developed fatal spirochetal jaundice two weeks after a fall into a cesspool. An analogous case was published by Stirl. The right to workmen's compensation was recognized in both cases.—K. R. Drinker.

WORKMEN'S COMPENSATION FOR INOCULATION WITH PLAGUE. Jour. Am. Med. Assn., July 29, 1922, 79, No. 5, 379.—The *Medicina Contemporanea* quotes in full the decision rendered recently, by the Lisbon court that deals with workmen's compensation cases, in the case of an attendant at a hospital morgue. His duties included assisting at necropsies, and he died eight days after being scratched on the finger during the necropsy of a plague victim. The lesions and bacilli of plague were found in him after death, and the court decreed that a compensation based on the salary the man had been getting should be paid to the widow and two children.

The Portuguese government granted a pension to the family of Professor Pestana under similar conditions; death followed contracting of plague from a cadaver. Our exchange queries, "And what about the physicians and nurses who have lost their lives from professionally acquired plague, typhus or pneumonia, during these last two years since the law on workmen's compensation has been in effect?"

A NEGLECTED PHASE OF WORKMEN'S COMPENSATION. *E. H. Lewinski-Corwin.* Nation's Health, March 15, 1922, 4, No. 3, 155-156.—The past ten years have proved the compensation laws dealing with industrial accidents in the United States to be, on the whole, a success. Too much stress, however, has been laid on economic relief and on the reduction of the frequency of accidents, and altogether too little thought has been given to the adequacy of medical provision for the victims of the accidents. There is need of a thoroughgoing study of the problem of administration of the medical benefit in workmen's compensation.—L. A. Shaw.

PENSIONS. Abstracted from L'Usine, Paris, Jan. 28, 1922, in Factory, May, 1922, 28, No. 5, 564, 566.—Pensions for old and incapacitated workers have been established by a number of French manufacturers. According to one plan workmen contribute a minimum of 1 per cent., and the owners contribute a like amount until ten years of service have been completed, when their contribution is increased to 1.5 per cent. After 20 years the employer's contribution is increased to 2 per cent. To encourage thrift a larger proportionate contribution is made by the employer as the employee's contribution increases. After five years of continued service, the payments of the owners remain unrestrictedly the property of the workmen.

COMPARISON OF WORKMEN'S COMPENSATION INSURANCE AND ADMINISTRATION. *Carl Hookstadt.* U. S. Dept. Labor, Bur. Labor Statis., Bull. No. 301, April, 1922, pp. 194.—As a result of the demand of state legislators and others for information regarding the relative merits of different types of insurance under workmen's compensation, this investigation was begun in 1919, and completed in 1920. The points upon which information was particularly sought were the relative costs, security, and service of the various types of insurance carriers. The question of costs included both the cost of insurance and the cost of administration. The question of security covered security both to employers and to injured workmen. In regard to service, three tests were taken into consideration: (1) promptness of compensation payments, (2) adequacy or liberality of payments, and (3) accident prevention work. An additional study was made of the administrative procedure of state industrial commissions and funds, especially in regard to methods of accident reporting and claim procedure.

THE PHYSICIAN AND WORKMEN'S COMPENSATION. *George E. Tucker.* Nation's Health, Feb. 15, 1922, 4, No. 2, 101-104.—There is an almost uniform agreement by legislators and parties at interest as to the purpose of workmen's compensation; yet there is so little similarity between the compensation laws of adjoining states, even when

the industrial conditions would seem to call for the same standard, that the probability of attaining any degree of legislative uniformity now seems very remote.

Among legislators, and even among physicians, when medical aid provisions have been considered, palliation instead of restoration has been allowed to become the object of their effort. Whatever shortcomings there are in the results obtained from the application of the compensation principle in this country and the part taken by physicians in connection with its operation, they may be attributed to faulty legislation and misunderstandings, and the cure will follow further study, investigation, education, and legislative amendments.

Particular emphasis is laid upon the fact that palliative measures are in the end wasteful, and that a consideration of physicians' fees, hospital expenses, and compensation to the disabled man during convalescence must not stand in the way of the most effective possible recovery.—L. A. Shaw.

Desirable Improvements in the New Jersey Workmen's Compensation System. *E. H. Downey.* Am. Labor Legis. Rev., June, 1922, 12, No. 2, 115-117.—This is a review of the report of the committee on workmen's compensation of the New Jersey State Chamber of Commerce, and it reinforces the claims made in that report. The plea is that the whole cost of work injuries ought to be borne by industry, whereas now in the state of New Jersey (and to a greater or less extent in every state) the cost is thrown upon the injured workman. New Jersey pays the injured workman not more than $12 per week, beginning with the tenth day after disability: for temporary disability industry bears 25 per cent. of the cost only. For permanent total disability, New Jersey pays $12 a week for 400 weeks. In case of death compensation is paid to the widow and children for not more than 300 weeks. "For this state of affairs there is no excuse in ethics, economics, or politics." The cost of 100 per cent. compensation for all work injuries would not amount to 10 cents on a pair of shoes. A decent and adequate scale of benefits would impose no hardship on the employer or on the consumer.—G. E. Partridge.

Occupational Diseases Excluded from Operation of Oregon Workmen's Compensation Act. U. S. Pub. Health Ser., Pub. Health Rep., June 2, 1922, 37, No. 22, 1314.—"It has been decided by the Supreme Court of Oregon that under the workmen's compensation act of that state an occupational disease is not a 'personal injury by accident,' and therefore is not compensable. The disease in question in this case was lead poisoning."—B. Cohen.

New York State Labor Law, with Amendments, Additions and Annotations to August 1, 1922. Pp. 143. New York State Miscellaneous Labor Laws, with Amendments, Additions and Annotations to August 1, 1922. Pp. 165. New York State Workmen's Compensation Law, with Amendments, Additions and Annotations to August 1, 1922. Pp. 112.—These pamphlets are listed for the benefit of interested readers.—M. C. Shorley.

So-Called Traumatic Displacements of the Uterus. *Harry E. Mock.* Jour. Am. Med. Assn., Sept. 2, 1922, 79, No. 10, 797-801.—The author discusses in this paper the frequency of so-called traumatic displacements of the uterus in personal injury claims, and contrasts with it the great infrequency of the actual occurrence of this condition. He then cites the opinions of various physicians and surgeons, obtained by questionnaires and by direct inquiry, as to the rarity of traumatic displacement of the uterus, and reviews the statements of various gynecological authorities upon trauma as a cause of displacement. Conclusions derived from the material presented are as follows:

1. Acute temporary displacements of the uterus may follow trauma, but the symptoms are so severe that relief is secured immediately, and the disability is only of short duration.

2. Permanent uterine displacements are never due to trauma *per se.*

3. Trauma may cause some exaggeration of an existing, unrecognized displacement, but careful study will demonstrate that the chief etiologic factors are some combination of the pre-existing conditions.—K. R. Drinker.

ABSTRACT OF THE LITERATURE
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GENERAL

THE INDUSTRIAL PHYSICIAN'S COMMUNITY RELATIONS. Nation's Health, Sept. 15, 1922, 4, No. 9, 549-550.—This article summarizes the findings of a committee of three appointed to report to the meeting of the American Association of Industrial Physicians and Surgeons upon the relations of the industrial medical practitioner to the activities of the non-industrial physicians and of other community health agencies.—L. A. Shaw.

REPORT OF THE COMMITTEE ON INDUSTRIAL HYGIENE, STATE AND PROVINCIAL HEALTH AUTHORITIES. Am. Jour. Pub. Health, Oct., 1922, 12, No. 10, 839-840.—In its report to the 1922 Conference, the Committee submitted for consideration three questions and tentative answers thereto as follows:

1. Is industrial hygiene a proper function for a state department of health? The question is answered in the affirmative, and reasons are given.

2. Is industrial hygiene of sufficient importance to give it a distinctive position in the organization? The answer suggested is that industrial hygiene be made a subdivision of either the bureau of general administration or medical welfare, employing for the personnel assignments persons from the engineering, nursing, sanitary inspection, statistical, and other bureaus.

3. What should a state department of health program for industrial hygiene incorporate? In answer, a program is submitted including the following suggestions:

(*a*) That contact with public factory inspection, labor and compensation agencies be secured.

(*b*) That education and publicity work for employers, employees, and the community be carried on.

(*c*) That information service and standard methods be established.

(*d*) That service in the form of demonstrations, inspections, research, medical and nursing consultations, etc., be installed.—Henry F. Smyth.

PROCEEDINGS OF THE INDUSTRIAL RELATIONS CONFERENCE, October 24-27, 1921. Penn. Dept. Labor and Indust., Ser. of 1922, 9, No. 2, pp. 252.—This pamphlet contains a very considerable number of brief papers presented at the Industrial Relations Conference held in October, 1921, under the auspices of the Department of Labor and Industry of Pennsylvania, together with the discussion following these papers. The articles of interest to industrial hygiene are "Employment of Minors," by Mary Anderson; "The Massachusetts Forty-Eight Hour Week vs. the Eight-Hour Day," by Ethel M. Johnson; "A Plan of Industrial Clinics for Philadelphia," by Dr. Mervyn Ross Taylor; "The Doctor an Educator and Promoter of Efficiency," by Dr. W. Seymour White; "Occupational Clinics for Industrial Service and Research," by Dr. Edward E. Mayer; "Rehabilitation of the Industrial Cripple," by Lewis T. Bryant, and "Progress in Compensation," by Robert E. Lee.—K. R. Drinker.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

THE TREATMENT OF CARBON MONOXIDE ASPHYXIA BY MEANS OF OXYGEN + CO_2 INHALATION. *Yandell Henderson, Howard W. Haggard,* and *Stuart Scott.* Jour. Am. Med. Assn., Sept. 30, 1922, 79, No. 14, 1137-1145.—This article, which constitutes Report 1, of the Commission on Resuscitation from Carbon Monoxide Asphyxia, organized at the request of the American Gas Association, reports investigations both in the field and in the laboratory on the treatment of carbon monoxide asphyxia by the inhalation of a mixture of oxygen and of 5 per cent. carbon dioxide. The authors first discuss the ineffectiveness of oxygen alone and then point out the value of adding carbon dioxide to the oxygen in order to stimulate vigorous breathing so that oxygen may be drawn into the lungs and carbon monoxide "washed out."

Laboratory experiments on animals and on men are cited to show the speed (within thirty minutes) with which high concentrations in the blood of carbon monoxide are reduced to harmless limits under oxygen + carbon dioxide inhalation. This speed of elimination is contrasted with the much slower elimination of carbon monoxide which occurs in patients left untreated or treated with oxygen alone.

The H-H. inhaler, the apparatus used for administering oxygen + carbon dioxide to gassed victims, is next described and directions for its use given.

The article ends with a report of the results of this type of treatment on a number of patients poisoned with illuminating gas in New York City. The author's conclusions with regard to the proper treatment of illuminating gas poisoning are as follows:

1. Manual artificial respiration by the prone pressure method should be employed, when respiration has stopped, to start spontaneous breathing. This object may be assisted by administering oxygen + carbon dioxide simultaneously.

2. Inhalation of oxygen and 5 per cent. carbon dioxide, by causing a very full ventilation of the lungs, rapidly eliminates carbon monoxide from the blood and thus terminates the condition of asphyxia. This treatment is highly effective, inducing rapid and complete recovery, if applied early enough. It requires merely general medical supervision, and may be safely and efficiently carried out by intelligent men of the type composing the emergency crews of a city gas company.

3. Until more definite knowledge has been obtained regarding the conditions in the lungs, brain and elsewhere, subsequent to gassing, and until treatment can be based on such knowledge and has been tested experimentally, it is inadvisable to apply any spe-

cific treatment in post-asphyxial gassing cases. The evidence here reported indicates that oxygen + carbon dioxide inhalation and rapid elimination of carbon monoxide greatly decreases the liability to nervous and pulmonary asphyxial sequelae.

THE HAZARDS OF CARBON MONOXIDE POISONING. *Yandell Henderson.* Nation's Health, Oct. 15, 1922, 4, No. 10, 607-609.—The health hazards due to the exhaust from automobiles have of late become so frequent that they are receiving very serious attention. The investigation of this problem includes (1) a consideration of the amount and chemical composition of the exhaust gas produced, and (2) the physiological effects of the substances in exhaust gas and the amounts which may be tolerated without injury. It has been shown (1) that practically the only toxic constituent in the exhaust gas is carbon monoxide; and (2) that carbon monoxide has no other toxic characteristic than its combination with hemoglobin and its consequent exclusion of oxygen. The symptoms of carbon monoxide poisoning of varying degrees of severity are discussed, together with the treatment by means of the administration of oxygen with an admixture of carbon dioxide, which proved far more effective than straight oxygen.—L. A. Shaw.

AUTOMOBILE EXHAUST GAS AS A HEALTH HAZARD. *Yandell Henderson.* Boston Med. and Surg. Jour., Aug. 3, 1922, 187, No. 5, 180-183.—In the treatment of carbon monoxide poisoning it is suggested that the administration of small amounts of carbon dioxide in conjunction with oxygen inhalations are highly valuable if not life-saving. The object of the carbon dioxide is to stimulate pulmonary ventilation. As a subcommittee of the American Gas Association commission on resuscitation from gas poisoning, Henderson and Haggard have tested this method in New York City. The results indicate that a deeply asphyxiated patient, who can be reached within a half-hour—and the utmost speed at this time is essential—and who is then given inhalations of oxygen containing 5 per cent. carbon dioxide, can be practically freed from carbon monoxide within thirty to forty minutes. Frequently consciousness returns within this time.—B. Cohen.

BENZOL POISONING: ITS OCCURRENCE AND PREVENTION. *Charles F. Horan.*—In an address before the National Safety Council in Detroit on August 30, 1922, Charles F. Horan gave an outline of certain points of the chemistry, manufacture, and uses of benzol; a chronological account of cases of poisoning reported; and a discussion of the mechanism of benzol poisoning and individual susceptibility.

The author concludes that benzol can be and is safely used in the rubber industry, but that frequent and regular physical examination of the worker and adequate ventilation for removal of the fumes are essential.—Philip Drinker.

TETRACHLORETHANE POISONING. *Frois.* Abstracted from Bull. de l'Acad. d. méd., July 11, 1922, 88, No. 28, 40, in Jour. Am. Med. Assn., Sept. 16, 1922, 79, No. 12, 1000.—Frois explains that artificial ventilation stirring up the air is not enough to prevent the toxic action from absorption of the fumes of this solvent. In twelve fatal cases reported in England the liver and kidneys suffered most and the blood did not show any alteration. He explains that the fumes are heavy, and the best means for prophylaxis is to draw them down and out with an exhaust ventilator. By this arrangement the manufacture of artificial pearls, for instance, can be carried on without danger of serious harm.—K. R. Drinker.

CONSTRUCTIVE INDUSTRIAL HYGIENE IN THE INDIARUBBER INDUSTRY. *C. A. Klein.* Jour. Soc. Chem. Indust., Aug. 15, 1922, 41, No. 15, 325R-328R.—This article contains a critical review of recent British legislation which became effective May 1, 1922. This governs vulcanization and treatment of rubber involving the use of toxic volatile solvents such as benzol, and compounding processes in which lead or lead compounds are used. The author shows that there has been a decrease in the number of cases of poisoning in spite of the greatly increased use of these substances. This decrease is due to the enforcement of ventilation rules whereby the toxic vapors are drawn off by fans, and lead dusts are removed in a somewhat similar manner. Mention is made of the use of a mixture of eighty parts of lead compounded with twenty

parts of pure rubber. This mixture is homogeneous, is sold in sheet form, is ready for direct incorporation with the other ingredients on the rolls, and offers the hygienic advantage of causing no dust.—Philip Drinker.

Report of Health Hazards Committee on Dangerous Materials Common to the Rubber Industry. *Charles F. Horan.*—In a report presented at the meeting of the National Safety Council in Detroit on August 30, 1922, dangerous materials listed were: aniline, antimony, benzine, benzol, carbon disulphide, carbon tetrachloride, hexamethylenetetramine, lead, para-nitrosodimethylaniline, para-phenylenediamine, sulphur chloride, and thiocarbonilide. Under each substance, to an extent varying with the importance of the substance in the rubber industry and with the known toxicological facts, were given facts regarding dangers, symptoms, severe cases, subacute and chronic poisoning, measures of relief, and prevention.—Philip Drinker.

Calcium Nitride Poisoning. *E. Hesse.* Abstracted as follows from Med. Klin., April 9, 1922, 18, No. 15, 461, in Jour. Am. Med. Assn., June 17, 1922, 78, No. 24, 1935.—Hesse reports experimental research with calcium nitride which is being used more and more extensively as a fertilizer. It is liable to cause a dermatitis, to injure the respiratory apparatus and to induce an affection resembling the hyperemia of amyl nitrite, plus malaise and acceleration of the pulse. The attack lasts only a few hours and leaves no traces. Its special feature is that it develops only when alcohol is taken, and the attack can be brought on by giving the essential element of the calcium nitride, cyanamide, with alcohol. No antidote is known. Prophylaxis is the main thing in factories, good ventilation, keeping down the dust by adding oil, and protecting with a mask against inhalation, but, above all, by refraining from alcohol.—K. R. Drinker.

Tar Cancer. *H. Jordan.* Abstracted as follows from Ztschr. f. Krebsforsch., Aug. 10, 1922, 19, No. 1, 39, in Jour. Am. Med. Assn., Oct. 14, 1922, 79, No. 16, 1373.—Jordan comments on the fact that the mechanical injury from coal dust does not induce cancer while there is no mechanical injury from coal tar, with which cancer is common, as also with soot. He reports that coal tar induced cancroids in four months in 100 per cent. of the white mice he treated with it. The residue of the tar after distillation induced production of the precancerous condition in half the time required for the whole tar.

The Detection of Small Amounts of Lead in the Urine. *O. Schumm.* Abstracted from Ztschr. f. physiol. Chem., 1922, Vol. 118, 189, in Med. Science, Aug., 1922, 6, No. 5, 431.—The applicability of several methods for the detection of small amounts of lead in the urine in cases of lead poisoning is examined. The author finds the most satisfactory method to be that of Meillère, modified as follows: 15 c.c. of 25 per cent. hydrochloric acid and 0.4 gm. of copper sulphate are added to 1½ liters of urine. Hydrogen sulphide is then passed through the liquid, first at ordinary temperature and then at about 40°-50° C. The precipitate is collected, extracted with nitric acid, and the extract electrolyzed at a tension of about 4 volts and a current strength of 0.5 amperes. An electrolytic separation of the copper and lead occurs, the latter metal depositing on the anode, an extract of which will give typical reactions of lead. The method serves to detect amounts of the order of 0.1 mg. of lead per liter.—M. C. Shorley.

Lead Poisoning. *Wade Wright.* Boston Med. and Surg. Jour., Aug. 31, 1922, 187, No. 9, 328-331.—Some statistics are given from the Industrial Clinic of the Massachusetts General Hospital. Nearly 2 per cent. of all patients admitted to the outpatient department were employed at work which exposed them to lead. Of this exposed group, about 10 per cent. presented evidences of industrial lead poisoning. Seven per cent. of a large group of recently recorded lead cases were of non-industrial origin.

In the discussion of this paper, Dr. John Key has taken up the pathology of lead poisoning and particularly of stippling in the blood.—J. C. Aub.

Gout and Lead Poisoning. *A. M. Brogsitter* and *H. Wodarz.* Abstracted as follows from Arch. f. klin. Med., May 5, 1922, 139, No. 3-4, 129, in Jour. Am. Med. Assn., July 8, 1922, 79, No. 2, 169.—In the eight cases of chronic lead poisoning and six of gout described here, there was nothing in the history to indicate that there had ever been an acute hemorrhagic nephritis, so the necropsy findings can be ascribed to the lead or the gout. Deposits of urates were found in only two cases, but the blood vessels showed pronounced changes in both the lead and the gout cases, as also the glomeruli; the findings in the tubuli differed materially.

Encephalopathy with Ocular Complications Probably Due to Lead Poisoning. *Albert C. Sautter.* Am. Jour. Ophth., June, 1922, 5, No. 6, 468-470.—This is the report of a case of probable lead encephalopathy. The diagnosis was based largely upon occupation, stippling in the blood, and mental symptoms of headache, diplopia, and drowsiness with rare convulsions. There was no lead line, and no lead was found in the urine.

The eye examination at first showed a low degree of neuroretinitis. Later examination revealed that this became more marked, with many hemorrhages and exudations. Within six weeks this action subsided and the fundus became essentially normal. A transitory paresis of the right external rectus muscle and contraction of the visual fields also occurred.

As collected statistics demonstrate, eye symptoms due to lead poisoning are relatively very infrequent.—J. C. Aub.

Regulation on the Use of White Lead. Jour. Am. Med. Assn., Sept. 16, 1922, 79, No. 12, 976.—The government of Tunis has informed the International Labor Office (League of Nations) of a recent decree regulating the use of white lead. This decree prohibits, after one year from the date of promulgation, the use of white lead, in both the external and the internal painting of buildings. White lead may not be used in other operations except in the form of paste. Hand work is forbidden, as well as dry scraping and dry rubbing down, and in all painting operations in which white lead is used the workers must be provided with clean overalls. Violations of this order will be subject to penalties.—K. R. Drinker.

DUST HAZARDS AND THEIR EFFECTS

A New Instrument for Sampling Aerial Dust. *L. Greenburg* and *G. W. Smith.* U. S. Bur. Mines, Rep. Investigations, Ser. No. 2392, Sept., 1922.—A two-hole rubber stopper is fitted into the top of a tall, conical, flat-bottomed precipitating flask of 500 c.c. capacity. Into one hole is fitted the exhaust leading to a flow meter and suction apparatus. A glass tube (5/8 inch by 9½ inches) for admission of the dusty air enters the other hole of the stopper. The bottom of this inlet tube is flat and pierced by fifteen holes, each approximately 0.8 mm. in diameter. By means of three lugs the bottom of the tube is kept at a distance of 0.8 mm. from the bottom of the flask.

Three hundred cubic centimeters of water are used in the flasks, the sampling and subsequent analyses being carried out in much the same manner as in the Palmer apparatus.

A brief table of efficiencies shows that this apparatus compares very favorably with the Bureau of Mines sugar-tube method. The details are too meager, however, to permit one to form an opinion on the practicality of the apparatus for general use.

Standard Method of Testing Dust Removal Efficiencies of Air Washers. *O. W. Armspach* and *Margaret Ingels.* With a New Method of Making Air Dust Determinations. *F. Paul Anderson* and *O. W. Armspach.* Jour. Am. Soc. Heating and Ventilating Eng., July, 1922, 28, No. 5, 533-544.—The authors give examples to show errors caused by counting dust particles by the usual method with the Sedgwick-Rafter Counting Cell. A new apparatus is described in which air, at a constant rate of flow, is drawn through a cloth filter and the pressure difference, as shown by a manometer, on the two sides of the filter gives a relative indication of air dustiness. Specifications and further tests with this apparatus

on various dusts are to form the subjects of subsequent articles.—Philip Drinker.

Summary of Investigations of Dust and Ventilation in Metal Mines. *D. Harrington.* U. S. Bur. Mines, Rep. Investigations, Ser. No. 2374, July, 1922.—For several years the Bureau of Mines has studied dust and ventilation in metal mines as affecting the health, safety, and efficiency of underground workers. A summary of the investigations which have been made is included in this report, together with a bibliography.

Free silica dust is considered the most dangerous to health, and other dusts are definitely known to have harmful effect; probably any finely divided, insoluble dust —including that of coal—breathed in large quantities for continuous periods of time by underground workers, will ultimately result in bronchitis, miners' asthma, lead poisoning, or miners' consumption, or will predispose workers to pneumonia or tuberculosis.

Questions yet to be solved are the following: Why one dust is more harmful than another; why dust of a certain chemical or mineralogical composition is harmful in one mining locality and relatively harmless in another; the best practical measures to avoid the ill effects of harmful dusts; how best to cause air to circulate with maximum efficiency and minimum cost to places where metal miners work; the quantities of air necessary under varying conditions; and the physiological effects due to various kinds of gases, degrees of air vitiation, and ranges of temperature and humidity.—M. C. Shorley.

The Pathology of Miners' Phthisis. *W. E. Gye* and *E. H. Kettle.* Lancet, Oct. 21, 1922, 203, No. 5173, 855-856. — This article throws further and important light upon the effect exerted upon living tissues by silica, a subject which the authors have already done so much to elucidate. Two questions are asked: (1) Why is silica, conspicuous and possibly alone among common dusts, capable of inducing extensive fibrosis? (2) How does the silicotic fibrosis aid the establishment of tuberculosis?

Experimental evidence is quoted in favor of answering the first question by the reply that silica causes fibrosis by acting chemically on the tissues and not in virtue of its physical properties; and of answering the second that silica dust and the tubercle bacillus, when concentrated in small foci, act together as irritants and set in motion a series of reactions on the part of the lung which neither alone is capable of initiating. The authors have shown that (*a*) colloidal silica is a cell poison; (*b*) colloidal silica is the most easily formed of silica soluble forms, the circulation of silica in nature depending upon this; and (*c*) living material (soil bacteria) is able to break up mineral silicates with formations of soluble silica.

Injections of soluble silica or silica dust in the tissues of animals cause the formation of fibrosis; the only obvious difference is that the reaction is more rapid and more transient with colloidal silica. These findings support the view that SiO_2 becomes soluble by hydration in the tissues. On account of their high degree of natural immunity to tuberculosis, mice were used for experimental purposes. When silica was introduced along with tubercle bacilli, the silica caused a necrotic coagulum in the tissues in which the bacilli proliferated abundantly. In other words, the silica broke down locally the immunity against tubercle. Soluble silica circulating in the blood stream was not found to influence materially a generalized tuberculosis, neither hastening nor retarding its progress. Apparently the growth of tubercle bacilli is promoted only where the poison is sufficiently concentrated to form local areas of tissue destruction.

The pathological explanation put forward of tuberculous silicosis in miners is that silica dust when inhaled exerts a destructive action on pulmonary cells whereby foci of necrosis are produced in which tubercle bacilli can multiply, while disorganization of the lymphatic drainage of the lung contributes to the process.—E. L. Collis.

The Problem of Dust Phthisis in the Granite-Stone Industry. *Frederick L. Hoffman.* U. S. Dept. Labor, Bur. Labor Statis., Bull. No. 293, May, 1922, pp. 178.—For the present purpose the results here presented are largely limited to the statistical aspects of the problem, though equally urgent is a comprehensive descriptive account

of shop conditions and processes of manufacture bearing directly upon health hazards. The results, in a general way, may be summarized as follows:

1. The granite-stone industry is carried on by wage earners who, broadly speaking, live under sanitary conditions above the average, so that possibly unfavorable environmental factors are of decidedly secondary importance.

2. The housing conditions under which granite workers live are also above the average, so that in this respect the environmental factors are favorable to a low mortality rather than otherwise.

3. Anthropometric records clearly establish the fact of a superior physique, indicative of a higher degree of disease resistance, as determined by a relative weight above the average. From this point of view, therefore, granite workers should experience a relatively low mortality from pulmonary tuberculosis instead of a mortality decidedly above the average normal to industrial occupations.

4. Granite workers, considered by specific occupations, show wide variations in tuberculosis frequency, the excess in the death rate being most marked among the men employed in granite-stone cutting, it being especially severe among the men employed in the use of pneumatic tools. Certain occupations, such as polishing, tool sharpening, bed setting, etc., do not show a marked excess, if any, in the mortality from pulmonary tuberculosis, clearly indicating that the risk is practically proportionate to dust exposure.

5. Compared with the normal death rate of adult males of the State of Vermont, or of New England, the mortality from pulmonary tuberculosis among granite-stone workers has increased enormously during the last two years, as contrasted with a diminishing mortality in the population at large.

The same conclusion applies to non-tuberculous respiratory diseases, for it is shown that the mortality from bronchitis, pneumonia, and asthma is also on the increase among granite cutters, in contrast with a diminishing rate of frequency among adult males of the general population.

While normally the rate of tuberculosis frequency diminishes with increasing adult age, the contrary is shown to be the fact as to granite cutters, among whom the death rate from pulmonary tuberculosis at ages 60 and over reaches truly appalling proportions, so much so that the statistical evidence would seem incredible if it were not supported by the additional and equally suggestive data for non-tuberculous respiratory diseases.

6. The investigation brings out clearly the supremely important fact that the incidence of the disease is practically proportionate to the length of the trade life. In other words, the effect of dust inhalation is one of growing seriousness, according to the rate of dust accumulation in the lungs.

These conclusions are in conformity to the observations made in South Africa and Australia, clearly indicating that the cause of the excessive liability to pulmonary tuberculosis is the inhalation of granite dust in a comminuted form of practically ultramicroscopical particles.

7. The nature of the dust inhaled also requires much more extended scientific consideration. For the present purpose, however, it is sufficient to state that the average silicotic content of granite is 72.96 per cent.; of sandstone, 85.42 per cent.; and of limestone, 1.22 per cent.

The evidence is absolutely conclusive that the dust hazard depends primarily upon the silicotic content of the dust inhaled. The evidence is also conclusive that workers exposed to marble or limestone dust suffer a decidedly lesser liability to pulmonary tuberculosis than those exposed to granite or sandstone dust, with a high silicotic content. For the present purpose it may be sufficient to say that radiological examinations have been of the utmost value in determining the progress of dust infiltration throughout the lungs and in clearly indicating the extent of stone consolidation to the point of fatality. If the so-called pulmonary tuberculosis among granite-stone cutters is not a true tuberculosis and therefore not infectious, some evidence should be forthcoming from the family records of deceased stone workers to substantiate this point of view.

8. The present investigation includes the question of previous occupation and many related aspects which do not admit of a brief generalization, such as hours of work,

dust removal, and length of vacation.

At the present time the death rate among granite workers is practically the highest known for any occupation on record, and the increase in the death rate from year to year is lamentable evidence of inefficiency on the part of health-promoting agencies to bring about reduction and control.—M. C. Shorley.

A Conception of the Chest Roentgen-Ray Densities Based on a Study of Granite Dust Inhalation. *D. C. Jarvis.* Abstracted as follows from Am. Jour. Roentgenol., April, 1922, 9, No. 4, 226, in Am. Rev. Tuberc., Sept., 1922, 6, No. 7, 192-193. —Roentgenographic studies proved that, given the same number of years of exposure to granite dust inhalation a cutter with the minimum amount of lymphoid tissue in the upper respiratory tract showed a minimum number of densities on the roentgenogram, while a cutter giving evidence of considerable lymphoid tissue in the upper respiratory tract showed in proportion many densities upon the film. It seems, therefore, that the lung and pleural lymphatics are brought into prominence in this condition. Serial roentgenograms disclosed the fact that it was possible, in order of their sequence, to divide the development of the densities upon the chest roentgenograms into six stages, as follows: *Stage I, that of the hilum:* If the hilum retains its crescentic form, without central enlargement, it is to be assumed that exogenous chemical or bacterial invasion has been near the minimum. If there are central enlargement and an increase in extent and density of the hilum, it is concluded that the patient has been in an unfavorable respiratory environment, inhaling bacterial or chemical irritants in large amounts for a short period or in small amounts for a long period. The periphery of the hilum may show what region of the lung has been most affected and hilum changes follow fairly closely the lung changes, clearing away when dust inhalation stops and reappearing when it is resumed. When certain pleural densities appear, the hilum changes regress; this is possibly explained by a disappearance of the lymph stasis when drainage from the periphery is cut off. Just external to the hilum and accompanying progressive change in the latter, circular densities develop; they disappear when absence from work occurs and reappear when granite dust is again inhaled. These have usually been considered diseased lymph nodes, but it is concluded that they are really valves in the pleural lymphatics which arrest the irritating material coming from the lung periphery, until the accumulation in the hilum can be moved on. *Stage II, that of linear densities:* This is separated into three divisions. The first division consists of the broad densities in the hilum zone, most noticeable in the descending trunks. These widened linear shadows come and go in granite cutters and seem to be caused by lymph stasis. The second division consists of linear densities appearing mostly in the midzone of the lung field; they represent septa existing between the lobules of the lung. The third division consists of a network of thread-like markings in the peripheral zone and a portion of the midzone of the lung; they are the last phase of the linear markings to appear and are the forerunner of "thickened pleura." They coincide with the polyhedral pleural rings and overlie the interlobular septa markings. *Stage III, that of circular densities, and stage IV, that of Dunham's fans:* Circular densities appear at the junction and also on the polyhedral rings. At first a fan-shaped area is outlined by the interlobar septa; then a circular density appears at the apex of this area, the size of the density depending on the behavior of densities peripheral to it when they occur. Fine linear markings then appear within the fan-shaped area and circular densities appear upon the interlobular septa acting as sides of the fan-shaped area. Circular densities develop upon the linear markings within this area and finally it is obscured by a diffuse cloudiness. The circular areas are on the course of lymphatics that are choked with dust and developed only as the process progressed. *Stage V, that of the peripheral haze:* This appears at the lung periphery following the development of all the linear markings and it is a forerunner of "pleural thickening." It extends from the clavicle downward. *Stage VI, that of the pleural lymph stasis:* This is represented by a thick haze, developing over the lung and depends on the extent of lymph stasis

in the pleura. X-ray studies indicate that we do not have only one infection by the tubercle bacillus and this occurring in childhood, but that we have innumerable infections all through life, and that the occurrence of a lesion depends in part upon the efficiency of the lymphatics which act as the first line of defense in event of an irritant, either mechanical, bacterial or chemical, entering the lungs by way of inhalation. At least twice a year a worker in a dusty trade, of which there are 200 in this country, should have an X-ray chest examination to determine the likelihood of subsequent respiratory disease.

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

Some Industrial Phases of Tuberculosis. *Frank A. Craig.* Nation's Health, Aug. 15, 1922, 4, No. 8, 491-494.—There is no more important part of the problem of tuberculosis that that which deals with the relationship between this disease and the industrial worker and his environment. The industrial group is highly important, and it is exposed to certain risks and factors peculiar to factory life and not reached by any measures directed toward the prevention of the disease in the general public.

The foremost need is for reliable information concerning the incidence of tuberculosis in industries, and in the occupations involved in them. Reports published are now lacking in uniformity and are so variable as to standards regarding defects that they are of little value for statistical purposes.

Some general principles may be applied to the problem of tuberculosis as it affects the industrial worker. A vigorous educational campaign is the first requirement. There must also be early detection of the disease—the preservation of the working capacity of the individual is almost absolutely dependent upon it. This fact is shown by the chart recently published by the Prudential Insurance Company of America based on a study of 65,000 cases, showing the results of treatment in sanatoria in cases with varying degrees of involvement.

The entrance examination is not sufficient, but should be combined with periodic health examinations of the entire working force at intervals that cannot be declared at present, though it seems as if examinations would be most effective in any general plant if conducted annually.

The rejection of the unfit and of dangerous cases is by no means the most important function of the entrance examination. Many men will be found who are below normal, possibly suffering from defects that cannot be corrected but that will not seriously interfere with working capacity if the men are suitably placed. Among such are cases with signs of slight contraction or fibroid change at one apex, or both, of the lungs. Selection of work for these men requires the greatest care and judgment on the part of the examiner. Probably the large majority of these men may perform work of a proper kind under suitable conditions with perfect safety, but they should not be assigned to any position that would expose them to dust, dampness, poor ventilation, or great variation in temperature; and they should not be allowed to do heavy manual labor. Competence in making diagnosis is highly important in this work, but, contrary to the general belief, this does not necessarily mean that every examining physician should be what is generally termed a tuberculosis expert. More cases of tuberculosis remain unrecognized because of lack of care and thoroughness in the examination than are missed because of ignorance or inexperience.—G. E. Partridge.

Gonorrhea and Syphilis in Industry. *William F. Snow.* Nation's Health, Aug. 15, 1922, 4, No. 8, 495-496.—Before the war the American health officer almost entirely ignored venereal diseases, but today there exists a reasonable practical organized defence against them. In this work there are four major activities: education; law enforcement, medical measures; and recreational facilities.

Both gonorrhea and syphilis are important from the standpoint of the industrial employer. They involve loss of time, morbidity, worry on the part of workers; their com-

municability, too, is a consideration. The result is undoubtedly felt in plant costs and production rates. Reduced production may result from muscular inco-ordination during early stages of tabes, ocular manifestations of syphilis, bladder trouble, early cardiovascular symptoms, bone and nerve involvement Latent syphilitic infection may play an important part in the immediate and late consequences of trauma, while from the late disabling manifestations of syphilis the employer sustains the greatest losses of all.

It has been shown that if a syphilitic workman sustains, under certain circumstances, an injury which causes an aneurism or paresis or any of the possible results of traumatizing syphilized tissue, he is entitled to compensation provided it can be proved that injury arose in the course of and through employment. The preexistence of syphilis does not lighten the responsibility of the employer. There is hardly a phase of plant management, therefore, that may not be affected by the presence of unrecognized or uncared for venereal disease.

The means open to the employer for controlling this loss are early recognition of cases and careful and thorough diagnosis and conscientious treatment. It seems feasible to approach the problem through the physical examination for employment or through the periodic examination, but the routine examination for the recognition of syphilis, etc., does not seem practicable. Greater special observation in the regular observation may be resorted to. The medical department of an industrial organization should not necessarily provide for the diagnosis and treatment of venereal diseases, unless there are no other facilities available. Industry is, however, reasonably interested in the betterment of community medical service, and for industrial organizations that largely make up the community it may even be profitable to finance entirely the community's attack on gonorrhea and syphilis.—G. E. Partridge.

HUMAN ANTHRAX AND ARSPHENAMIN. *A. H. Louw* and *A. Pijper*. Abstracted from So. African Med. Rec., July 22, 1922, 20, No. 14, 273, in Jour. Am. Med. Assn., Sept. 16, 1922, 79, No. 12, 999.—The treatment of human anthrax by means of intravenous injections of arsphenamine or its substitutes has been employed by Louw and Pijper in eleven cases. All the patients made a very speedy recovery.—K. R. Drinker.

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

FORMALDEHYDE ECZEMA FROM PASTE. *Chajes*. Zentralbl. f. Gewerbehyg., May, 1922, 10, No. 5, 136-138.—Thirteen workers in a papier-mâché plant, who handled paste all day, suffered from acute and beginning chronic eczema on the hands and arms. This yielded readily to treatment when the paste was changed so that formaldehyde was no longer used to preserve the starch in the paste. Excess sodium chloride was substituted and the men returned to work without trouble. The formaldehyde was less than 0.5 per cent. in the fresh paste used.

INDUSTRIAL OPHTHALMOLOGY. A SURVEY OF TWENTY-FIVE THOUSAND CASES. *V. E. Van Kirk*. Jour. Am. Med. Assn., Sept. 16, 1922, 79, No. 12, 951-954.—The series of cases upon which this survey is based comes from a steel mill employing about 8,000 men. Severe injuries to the eyes have been greatly reduced during the past twelve years by educating the employees, and by the compulsory use of goggles and other safety devices. By far the greater number of the cases are minor injuries, the majority from foreign bodies. All eye cases are seen by the company ophthalmologist who visits the first-aid station at a definite time every day. When a foreign body cannot be removed with a cotton swab by the physician or nurse on duty, the patient is made comfortable by instillation of phenacain or butyn solution, mercuric chloride ointment and a patch. The patient is then allowed to return to work until the next visit of the ophthalmologist, when the foreign body is removed and the necessary treatment instituted. Careful follow-up work is an important factor in eliminating the occurrence of corneal ulcers, and

in reducing to a minimum the amount of lost time.

The author next refers briefly to the occurrence of intra-ocular foreign bodies and of eye burns, to the treatment of corneal opacities and of cases of exposure to electric flashes, and to the occurrence of trachoma among his workers.

The paper ends with the suggestion that the next step in industrial ophthalmology will be the refraction of all employees and the correction of defects—a procedure which will be more than paid for by the increased efficiency of the men.—K. R. Drinker.

INDUSTRIAL DISEASES OF THE EYE. *H. Dickinson.* Am. Jour. Ophth., Aug., 1922, 5, No. 8, 674-676.—At a recent Congress of the Ophthalmological Society of the United Kingdom, the following industrial diseases of the eye were discussed: Optic neuritis due to lead poisoning, accidents, miners' nystagmus and glass blowers' cataract, tobacco amblyopia, anthrax, visual fatigue and the relation of industrial work to myopia, visual acuity and vocational selection, visual acuity as related to accidents, tin-plate workers' cataract, cataract among iron workers, and posterior polar cataract as related to the work of gold smelters and assayers.—G. F. Partridge.

FIRST REPORT OF THE MINERS' NYSTAGMUS COMMITTEE. Med. Research Council, Special Report Series No. 65, London, 1922, pp. 64.—The Miners' Nystagmus Committee which has been engaged in investigating the causation and means of prevention of miners' nystagmus, gives here a detailed report of its results.

A former view of the disease, namely, that it is a local myopathy of the elevator muscles of the eyes or the result of excessive accommodation, has been replaced by the view that it is either a general fatigue of the whole oculomotor system or a general neurosis with special local manifestations in the oculomotor apparatus.

The report includes a brief historical survey; a study of the incidence of the disease with reference to economic factors, seasonal prevalence, etc.; a description of the disease, its symptoms, physical signs, and course; etiological factors; diagnosis; prognosis; and treatment. There is a reference list of seventy-one items, many maps, photographs, and diagrams, and an appendix by Dr. W. H. R. Rivers on psychoneurotic symptoms associated with miners' nystagmus.

The committee unanimously reached the conclusion that the essential factor in miners' nystagmus is deficient illumination. Other factors, such as position, accidents, alcoholism, infections, malnutrition, hereditary predisposition and errors of refraction are of secondary importance, while depth of working places, thickness of seams, and the ordinary gaseous impurities in mine air have no direct influence upon it. The deficient illumination is due to the low illuminating power of the safety lamps in general use, to the distance at which the lamps must be placed from the work and the great absorption of light by the coal and coal-dust covered surfaces. Workers at the coal face are more affected than underground workers.

The main remedy is to make all possible effort to have the standard of illumination of the objects looked at by the miner equal to that of an open-light pit. This can be done by greatly increasing the power of safety lamps, or by the use of an electric light capable of being fixed on a miner's head belt or other convenient place, and by whitewashing parts of the pit other than the coal face. To prevent the occurrence of psychoneurotic symptoms, the erroneous belief that the disease causes permanent damage to sight and even total blindness should be dispelled. The investigation of various localities led to the conclusion that the great variations in incidence cannot be explained unless the influence of the attention paid to the disease is taken into account. Comment is made on the fact that in consequence of scheduling miners' nystagmus in the Workmen's Compensation Act of 1906 the incidence of the disease has been greatly increased, solely through action on the psychical and psychoneurotic aspects of the disorder.—G. E. Partridge.

EYE SYMPTOMATOLOGY IN OCCUPATIONAL DISEASES. *Donald J. Lyle* and *Carey P. McCord.* Nation's Health, Oct. 15, 1922, 4, No. 10, 613-615.—The purpose of this paper is to describe a number of occupational affec-

tions of the eye that do not present the ordinary characteristics of the swiftly produced injury; that may develop slowly and insidiously, and therefore are not associated either by the worker or the physician with the occupation which may be the producing cause. Occupational affections of the eye are discussed under the following heads: occupational affections, nystagmus, carbon-monoxide poisoning, ocular lead poisoning, methyl alcohol, aniline, and occupational cataracts.

THE LOCALIZATION AND EXTRACTION OF INTRA-OCULAR FOREIGN BODIES. *James M. Patton.* Jour. Am. Med. Assn., Sept. 23, 1922, 79, No. 13, 1030-1034.—The points which the author of this paper stresses are as follows:

In any case of a penetrating wound of the eye, the absence of a foreign body must be proved.

If the roentgenologist cannot localize accurately, co-operate with him experimentally until he can.

Discuss the prognosis with the patient or a responsible relative before beginning the operation.

Choose the route in accordance with the needs of the individual case.

Do not give up too easily. Success is frequently the result of repeated efforts.

RADIOGRAPHY OF FOREIGN BODIES IN THE EYE. Am. Jour. Ophth., Aug., 1922, 5, No. 8, 677-678.—The foreign bodies that are usually sought in the eye are generally situated in the anterior part. Most of the work that has been done in locating such bodies has been on the assumption that the examination must be made with tubes and exposures that will cause the rays to penetrate even thick bony masses, whereas if a radiogram can be obtained showing the soft parts as the lids, lashes, profile of the cornea, etc., the foreign body will give a more distinct shadow on it, and be better located. The difficulty in making the desired short time exposure is in placing the tube or film where it can receive the rays that have passed through the eyeball without going through bony structures. Recently Vogt has described a method of thrusting the sensitized film, properly wrapped, into the conjunctival sac adjoining the nose, or in the lower culdesac, placing the tube so that the rays will pass just anterior to the outer or upper margin of the orbit; thus obtaining negatives of great distinctness and delicacy, showing the anterior segment of the eyeball and any foreign body that it contains.—G. E. Partridge.

SELECTING PROPER GOGGLES FOR THE JOB. *E. S. Chapin.* Nat. Safety News, Sept., 1922, 6, No. 3, 39, 44.—The best information on the subject of proper selection of goggles is contained in the National Safety Code for the Protection of the Heads and Eyes of Industrial Workers, Handbook No. 2, issued by the Bureau of Standards in Washington. In it industrial processes are grouped according to the nature of the hazard, while the type of goggles best for each is recommended. In general, when selecting goggles it is well to observe differences among the samples that conform to the code and to give preference to that type which will be most comfortable to the wearer. Results of tests should be tabulated and distributed to storekeepers, shop managers, and others responsible for the ordering and use of goggles. Particular attention should be paid to workmen requiring corrective lenses; in these cases frames should be of the rigid bridge type.

Several lines of improvement may be suggested: that the weight of goggles be decreased without sacrificing strength; that materials used be less liable to break or deteriorate; that, on unpadded frames, surfaces bearing against the face be made broad, smooth, and correct in form.

SPEEDING UP WORK WITH WHITE TYPEWRITERS. Abstracted from Eye-Sight Conservation Council of America, 1922, in Factory, Sept., 1922, 29, No. 3, 312, 314.—Unnecessary fatigue is produced by looking at objects of different color and of different brightness, such as white paper and a black typewriter. This fatigue is due to the fact that the pupil of the eye is constantly trying to adapt itself to that part of the retina of the eye which is under-stimulated or over-stimulated by black and white objects viewed simultaneously.

The white typewriter has been shown to secure extremely high speed with the least fa-

tigue resulting. Consequently, any worker who works continuously on a black and white object will have the pupils of his eyes continuously contracting and expanding alternately with an ever-increasing periodicity until excessive eye fatigue sets in.

DETERMINATION OF DISABILITY AS TO LOSS OF HEARING, AND THE IMPORTANCE OF VERTIGO IN INDUSTRIAL ACCIDENT CASES. *Harold A. Fletcher.* Jour. Am. Med. Assn., Aug. 12, 1922, 79, No. 7, 529-531.—The following conclusions by the author sum up the contents of this paper:

1. More thorough examination, deeper thought and more careful analysis of industrial injuries involving the ears, and more comprehensive reports to the insurance companies should be the physician's endeavor.

2. It is believed that the hearing can be more fairly estimated by a system of weights proportionate to the value of the tests for hearing.

3. The neurotologic examination should be made of all patients with head injuries complaining of vertigo, as the findings in these examinations may be the only evidence by which the neurologist can differentiate the traumatic neurosis from those cases in which there are central organic disturbances.

4. These patients should be reexamined over a period of years, if possible, to determine the relation of the duration of the symptoms to the duration of his abnormal reactions.—K. R. Drinker.

OCCURRENCE AND PREVENTION OF INDUSTRIAL ACCIDENTS

INDUSTRIAL ACCIDENTS AND THEIR PREVENTION. *A. Wiese Hammer.* Nation's Health, Aug. 15, 1922, 4, No. 8, 497-499.—This is a general article emphasizing the great excess of industrial accidents in the United States over those in other countries, and outlining the legal situation and the ideal status of compensation that would be attained if the public, the employer, and the employee each assumed an equal share of responsibility, and if the present unassigned burdens were distributed properly.—G. E. Partridge.

UP-TO-DATE PROTECTION FOR PUNCH PRESSES. *C. B. Auel.* Nat. Safety News, Sept., 1922, 6, No. 3, 33-34.—The worker on continuous or repetitive work is usually readily protected, but when a general purpose press has to be adapted to a variety of work the problem is more complicated. When left-over material is used on new work, the problem is still more difficult. The most positive guard for this kind of work is perhaps one which encloses the ram, leaving just sufficient space, not exceeding three-eighths of an inch, for the insertion and removal of the material. Many jobs do not admit of a positive guard, however, and resort must be made to other forms such as hand tools, etc., for handling materials and sweep guards which push or pull the hands out of danger. A further safeguard is a non-repeat treadle attachment which prevents a second stroke of the press until the treadle is again depressed.

SAFE CLOTHING FOR INDUSTRIAL WORKERS. *G. E. Sanford.* Nat. Safety News, Sept., 1922, 6, No. 3, 32.—While accidents caused by improper clothing are comparatively few in number, they are usually severe. They are most common in the fall of the year, when, on account of the cold, workmen begin to turn down their sleeves. The time, therefore, for the safety engineer to make a special drive against the loose sleeve hazard is just before the autumn frosts are expected. The use of gloves, also, is a danger that must be controlled. Many industrial occupations require gloves, but the man who habitually uses gloves unnecessarily is a dangerous man in the shop. Linen dusters and long aprons have caused serious accidents, and loose hair is a menace. Women should be encouraged to wear caps, hair nets, or, in warm weather, bands of white voile across the forehead. Men who wear the hair long in front should wear caps. Special clothing is required in such occupations as foundry work, and the writer has been experimenting with shoes laced in the back which protect from metal splashes and also provide support for the ankles. For such operations as require the

use of gloves, hand covering should be provided that is suited to the special need.

PROTECTING THE ELECTRICAL WORKER WITH SAFER CLOTHING. *H. J. Burton.* Nat. Safety News, Sept., 1922, 6, No. 3, 42.—There are many accident hazards due to improper clothing, some common to all industries, some peculiar to given trades. The electrical worker is exposed to both kinds.

If a man has metal on his person his clothing becomes to a greater extent a conductor of electricity. Dry cotton and wool are not good conductors, but clothing that is wet or damp is more or less a conductor. Circuits formed with dangling chains attached to metal buttons in contact with damp underwear have resulted sometimes in fatal shocks. The wire used to stiffen the rim of a hat may prove dangerous. Everything of this kind is unsafe, as are glasses with metal frames. Celluloid collars are bad. Nails in the shoes are a menace, although the shoe without nails, if damp, is also unsafe. The electrical worker should know that when standing on the ground or on a concrete floor he is "permanently and effectively grounded."

Conductors carrying primary voltages should not be touched with the bare hands, with ordinary gloves, or with metal tools or objects held in the bare hands. Dry clothing is slight but insufficient protection; standard rubber gloves, insulated tools, lineman's protectors, and rubber blankets to cover adjacent conductors are good. A sound rubber shoe or boot without nails gives good protection for the man who works around low voltage conductors. Goggles should be worn whenever there is danger of an electric arc or flash. The provision of a proper uniform, such as a one-piece suit having no loose ends, tends to prevent accidents.—G. E. Partridge.

INDUSTRIAL SURGERY

THE FOOT FACTOR IN THE FUTURE OF WOMEN. *Harriet Wilde.* Nation's Health, Sept. 15, 1922, 4, No. 9, 520-524.—Distorted feet may be caused either by the nature of the shoe which is worn, or by the manner in which one walks or stands. In this article the author discusses the normal versus the abnormal foot; the correct manner to stand and walk; the effect upon the foot of various types of shoes, etc., with special reference to women.—L. A. Shaw.

A METHOD FOR MAINTAINING PRESSURE OVER ELBOW IN OLECRANON BURSITIS (MINER'S ELBOW), WITHOUT IMMOBILIZING THE JOINT. *Guy S. Van Alstine.* Jour. Am. Med. Assn., Aug. 12, 1922, 79, No. 7, 557.—The author describes a bandage, cut from an automobile inner tube, which he uses in cases of recent olecranon bursitis to maintain pressure on the bursal sac without greatly inhibiting the joint action. With this device patients are able to continue their usual occupations while under treatment.—K. R. Drinker.

TREATMENT OF INDUSTRIAL ACCIDENTS TO THE KNEE-JOINT. *R. Wallace Billington.* Jour. Am. Med. Assn., Oct. 7, 1922, 79, No. 15, 1207-1209.—Injuries to the knee resulting from industrial accidents comprise practically all types of traumatic lesions, except gunshot wounds, and these have their counterpart in the penetrating and lacerating wounds not infrequently encountered. Knowledge of special points in the diagnosis and treatment of knee injuries is essential if these patients are to be back at work in the shortest possible time and with the least disability.

Among the more common types of knee injuries encountered are simple traumatic synovitis, subacute or chronic synovitis, injuries to the semilunar cartilages, rupture of the internal lateral ligament and of the crucial ligaments, fracture of the tibial spine or its inner tubercle, Osgood-Schlatter disease, dislocations of the patella, fractures of the femur and tibia which enter into the knee joint, and open wound into the joint cavity. The author discusses practical points in the proper treatment of these various conditions. —K. R. Drinker.

INDUSTRIAL PHYSIOLOGY: NUTRITION, METABOLISM, FATIGUE, ETC.

THE EFFICIENCY OF MAN. *E. P. Cathcart.* Lancet, Sept. 9, 1922, 203, No. 5167, 547-551. —There are two types of human efficiency: mechanical efficiency in the engineering sense, and industrial or productive efficiency. Both are closely related and both are physiological problems. New inventions may revolutionize shop equipment, but, so long as machines need men, physiological laws must be a factor in industrialism. The unhygienic conditions produced by the industrial revolution exposed the national stock to a strain which manifested itself in the high yield of C3 lads recorded in the National Service Report; while the latest Health Insurance figures give the minimum average amount of sickness per annum as 14,476,074 weeks, or upwards of 278,000 years.

The human organism is not at fault; it has a whole series of protective mechanisms at its command, and, so long as it remains physiological, it is practically unaffected by ordinary hard work. Fatigue is the main protective mechanism of both mechanical and industrial efficiency. Fatigue—a diminished capacity for doing work—cannot be determined by any known quantitative test; certainly study of metabolism gives little or no clue, for a person may be on the verge of absolute collapse with no marked evidence of diminished efficiency in a mechanical sense.

Four factors contribute to maximum efficiency—speed, rest, rhythm, and work habits. With regard to speed, so long as it is subject to the capacities of the human agent, and is not the driver of those capacities, it counts as gain; this observation of field workers is substantiated by laboratory experiments in which an optimum speed for muscular contraction was found; speeds above or below gave less efficiency. Speed is directly associated with load; there is an economic optimum with high efficiency and a low oxygen consumption per kilogrammeter, and a mechanical optimum when output in unit of time is highest; the two do not coincide. When load becomes excessive, efficiency rapidly falls away, because static expenditure in muscular effort, which is parasitic on dynamic work, becomes dominant. Rest allows removal of waste products and a more abundant supply of oxygen; there is a tendency to find spontaneously the optimum rate of work where intervals of repose suffice for recuperation; still little attention has been directed to planning rest-periods in relation to work in progress. Rhythm is a fundamental property of the nervous system, and the capacity of the organism to build up a series of rhythmic reflexes is a potent factor in preventing fatigue; workers naturally adopt rhythmic movements, although not always the most efficient. Nutrition is another factor, since food inadequate in quantity or quality lowers actual performance and resistance to disease; of this Germany during the war provided a gigantic experiment. Monotony and atmospheric conditions also play their part. Efficiency is complex and needs for its investigation co-operation between the research worker, the employer, and the employee.—E. L. Collis.

MOTOR CAPACITY WITH SPECIAL REFERENCE TO VOCATIONAL GUIDANCE. *B. Muscio.* Brit. Jour. Psychol., 1922, 13, pp. 157-184.—Many mental tests, the specifically "intelligence" tests, show a high positive correlation, and this is an important fact in vocational guidance. Very few investigations have hitherto been made to determine the correlation between motor tests, with a view to finding out if a general motor capacity exists. Tests were made on a group of 20 boys, aged about 15; groups of 16 and 20 girls, aged 13; a group of 20 women medical students; and one of 12 Cambridge undergraduates, 6 men and 6 women. The tests employed consisted of (*a*) tapping at the greatest possible rate; (*b*) drawing a pencil point between two lines 2 mm. apart; (*c*) time taken to fit blocks into the holes of a form board; (*d*) time taken to put matches back into a match box; (*e*) capacity to hold a thin metal rod inside a small circular hole without allowing it to touch the circumference; (*f*) an aiming test (Whipple); (*g*) a total strength test (Martin), and one or two other tests. All the

tests were not, however, used for each group of subjects.

The correlation coefficients observed were usually very small and were often negative. In one group the highest coefficient observed was 0.40, and in another group, 0.50. In one group alone (the undergraduates) there was moderate correlation, the highest coefficient observed being 0.56, while more than half the coefficients exceeded 0.36. As far as the tests go, they show little or no increase of intercorrelation as the result of practice, and they agree in this respect with Hollingsworth's observations on motor tests. His mental tests, on the other hand, showed that practice increases the intercorrelations to a marked degree. The author comes to the conclusion that terms such as "motor dexterity" or "practical ability" are misleading, as a person's relative performance in any one motor test does not represent what will be performed in any other motor test.

Hence it follows that, from the point of view of vocational guidance, every occupation which consists mainly of a routine performance of specific movements will require specific vocational tests of just those motor capacities that function in that occupation. Motor capacities are relatively independent of intelligence, for since motor tests do not correlate positively with one another to any appreciable degree, they cannot in general correlate positively with any other tests, and therefore not with intelligence tests.—H. M. Vernon.

Apparatus for Estimating the Working Capacity of an Upper Extremity. *J. Glaister, Jr.* Brit. Med. Jour., Aug. 26, 1922, 2, No. 3217, 380-381.—This apparatus consists of a box 36 inches long, 12 inches broad, and 20 inches deep, with a series of six holes in the upper surface, through each of which projects a steel bar fitted with a handle on the outside and a hook on the inside; to the inside hooks are attached weights in a graduated series. The advantages appear to be (1) that the patient cannot see the weights which he is asked to lift; (2) that the order and the amount of any weight can be altered at the will of the examiner; (3) that it is a help in the detection of malingering; and (4) that, as the rods are each 1 foot in length, the working capacity can be assessed in foot-pounds.—W. F. Dearden.

Lessened Ability to Distinguish Colors as a Sign of Fatigue. Jour. Am. Med. Assn., Sept. 9, 1922, 79, No. 11, 909.—As the result of examination of athletes following various forms of physical exertion, it has been shown that as the body becomes fatigued the ability to distinguish colors becomes much diminished. According to Boehmig, who has an article on the subject in the *Münchener medizinische Wochenschrift,* certain subjects who, when examined immediately before the physical performance, were found to possess a perfectly normal ability to distinguish colors, were unable, after the body became fatigued, to recognize the color of very small green and red objects, and some presented transient scotomas, which, however, were of a mild sort, so that the subjects were frequently not aware of their existence. In the case of the heavy smokers and those addicted to alcohol, the manifestations appeared in a more marked form. The so-called fatigue substances will doubtless have to be assumed to be the cause of this hitherto unobserved disturbance of color vision.

HAZARDS OF COMPRESSED AIR, DIMINISHED PRESSURE, GENERATION AND USE OF ELECTRICITY, AND ELECTRICAL WELDING

Regarding Death from Electric Current. *Karl Meixner.* Wien. klin. Wchnschr., 1922, 35, No. 28, 619-623.—The postmortem findings in four cases of accidental death are described. The very striking fact is observed that these cases showed lesions of early heart disease such as are seen in young adults who have died suddenly from natural causes. It is a question, therefore, whether a sudden attack of weakness caused the shock to be fatal, or whether the opposite occurred. Aside from local burns, no other lesions were observed that were referable to exposure to the electrical current.—B. Cohen.

PATHOLOGIC CHANGES PRODUCED IN THOSE RENDERED INSENSIBLE BY ELECTRIC SHOCK AND TREATMENT OF SUCH CASES. *J. A. MacWilliam.* Abstracted from Arch. Radiol. and Elec., June, 1922, 27, No. 1, 11, in Jour. Am. Med. Assn., Oct. 14, 1922, 79, No. 16, 1364.—By experimental investigation MacWilliam has found that there are two modes of immediate death by electric shock, and there may be a combination of the two. In the ventricular fibrillation due to electric shock, artificial respiration should be at once begun to keep open the possibility of recovery of the ventricular beat which may possibly occur, though if the period of ventricular fibrillation is more than a very brief one the central nervous system will probably have suffered irretrievable damage from the period of circulatory arrest. The only active remedial measure that has been found useful in ventricular fibrillation so far, that is, massage of the heart through the diaphragm after the abdomen has been opened, is obviously not available under the conditions in which electric shock occurs. Heart massage, when applicable, is rendered much more effective by the intracardiac injection into left ventricle or a vein of urethane, from 0.025 to 0.25 gm.; strontium chloride, from 0.01 to 0.06 gm.; epinephrine, from 0.1 to 1 mg.; herudin, from 8 to 10 mg.; pilocarpine (injected into vein), 0.0025 gm.

WOMEN AND CHILDREN IN INDUSTRY

CARE OF OLDER WOMEN EMPLOYEES BY BOSTON RETAIL STORES. *Sarah L. Proctor.* Abstracted from Women's Educational & Indust. Union, Boston, Studies in Economic Relations of Women, 1921, 11, 103-108, in Digest, May-June, 1922, 4, Nos. 5-6, 18.—In eighteen large and long established retail dry goods and clothing stores in Boston, only 9.9 per cent. of the 4,190 women for whom data were available, had been with the firm for ten or more consecutive years at the time of the inquiry. Many women had made changes in employment after from twelve to twenty-six years of service with one firm. Six of the stores aided their retired women with gifts of money when trying situations arose. Five firms shifted older women to lighter jobs and others permitted them to come later and leave earlier.

Only one firm had a definite pension system in use. Under this, employees earning $20 or less received pensions figured on 3 per cent. of the average annual salary for the past ten years, multiplied by the number of service years. If the salary exceeded $20 weekly, the yearly pension was figured on 2 per cent. of the average annual salary.

CHILD LABOR PROHIBITIONS FOR INDUSTRIAL HOME WORK. Am. Child, Aug., 1922, 4, No. 2, 78.—The following regulations governing industrial home work, submitted for a final public hearing at Philadelphia on May 4, 1922, were adopted by the Industrial Board, May 9, 1922, to become effective September 1, 1922:

1. Minors under 14 shall not be employed in industrial home work.
2. No minor under 16 may be employed for more than fifty-one hours a week, nor more than nine hours a day, nor before 6 o'clock in the morning nor after 8 o'clock in the evening.
3. Every minor between 14 and 16 years of age must attend, for the equivalent of not less than eight hours each week, a continuation school in the school district where said minor is employed.
4. These eight hours shall be reckoned in the fifty-one hours a week permitted above.
5. Minors between 14 and 16 shall not work without an employment certificate, which certificate must be kept on file by the employer.
6. General employment certificates are required where children under 16 are employed all the time.
7. Vocation employment certificates are required where minors under 16 work at any time except when they are required to attend school.
8. Employment certificates may be issued only by the District Superintendent, Supervising Principal, or Secretary of the Board of School Directors, or other school official, deputized in writing by any of the other school officials authorized by law to issue such certificates.
9. No minor under 16, who has not completed the work of the sixth grade in public schools, shall be entitled to an employment certificate.
10. Before an employment certificate be issued, the prospective employer must make a statement in writing that he expects to give employment to a minor applying for such certificate.
11. Employers must acknowledge, in writing, to the issuing officer, receipt of an employment certificate within three days after beginning of minor's employment.
12. Upon termination of employment, the employer must return the employment certificate to the issuing school official.

THE WORKING CHILDREN OF BOSTON. A STUDY OF CHILD LABOR UNDER A MODERN SYSTEM OF LEGAL REGULATION. *Helen Sumner Woodbury.* U. S. Dept. Labor, Children's Bur. Pub., No. 89, 1922, pp. 374.—This study was undertaken for the purpose of ascertaining the amount, character, conditions, and effects of employment of children under 16 years of age in an American city of diversified industries and a considerable volume of trade, and in a state having comparatively advanced child labor legislation. Information in regard to these child workers was obtained chiefly from:

1. The employment-certificate records of Boston, Cambridge, Somerville and Chelsea.
2. The Boston continuation-school records.
3. Schedules taken in interviews by agents of the bureau with a group of children attending the Boston continuation school.
4. Replies to a questionnaire sent out in December, 1918, to the children who had been interviewed.

In addition a special study was made of the child labor laws of Massachusetts and of their administration in Boston and its neighboring cities. For the findings of this study the reader is referred to the original report.—M. C. Shorley.

INDUSTRIAL SANITATION: FACTORY CONSTRUCTION, ILLUMINATION, VENTILATION, HEATING, WATER SUPPLY, SEWAGE DISPOSAL

OIL CAMP SANITATION IN THE SOUTHWEST. *C. P. Bowie.* Nation's Health, April 15, 1922, 4, No. 4, 222-225.—A deplorable lack of sanitation exists in many of the oil camps of Texas, Oklahoma, Louisiana, and Kansas. These mushroom communities, aptly termed "ragtowns," often have no water supply or a wholly inadequate one; garbage, rags, refuse of all sorts, are strewn promiscuously about. Privies are largely make-shift affairs with no pretense of screening from flies or protection from vermin. Insanitary conditions such as these result frequently in costly fires and epidemics, typhoid, dysentery, diarrhea, and in a loss of working efficiency among the men, which is often as high as 25 per cent. Statistics show that the time saved from illness by good sanitary measures far exceeds the expenditure for sanitation.

The three main factors in good camp sanitation are the building of the camp on high, dry land, with proper drainage; the provision of a safe water supply, and the installation of an adequate sewage and waste disposal system. The author especially recommends the septic-tank method of sewage disposal as suitable for camps of the type under discussion.—K. R. Drinker.

NEED OF ADEQUATE ARTIFICIAL ILLUMINATION. *G. Bertram Regar.* Nation's Health, Sept. 15, 1922, 4, No. 9, 550-553.—Manufacturers are beginning to realize that adequate lighting is a substantial aid to production, not only because it is conducive to increased efficiency, but also because 18 per cent. of industrial accidents are due to defects in lighting installations. Having secured a lighting system which meets with the requirements of health, safety, and efficiency, the question of maintenance, especially with reference to windows and painting of walls, is of the utmost importance. A well-lighted factory also exerts a profound psychological effect upon the workers, serving to reduce discontent and provide happiness.—L. A. Shaw.

MANUFACTURED WEATHER AND PERSONAL EFFICIENCY. *Willis H. Carrier.* Chem. and Metall. Engin., Aug. 30, 1922, 27, No. 9, 449-452.—This is a general discussion of the subject.—Philip Drinker.

VENTILATION FUNDAMENTALS — WHERE DOES THE SOCIETY STAND? *E. V. Hill.* Jour. Am. Soc. Heating and Ventilating Eng., Sept., 1922, 28, No. 6, 605-617.—The author presents a brief discussion of methods in vogue for determining ventilation efficiency, followed by a plea for a standard practice among engineers and physicians. Examples are given of the use of the synthetic air chart which the author urges be employed as a basis of standardizing ventilation efficiency.—Philip Drinker.

INDUSTRIAL VENTILATION AS APPLIED TO DUST AND FUME REMOVAL. *H. M. Nichols* and *F. R. Ellis.*—At a meeting of the National Safety Council in Detroit, on August 30, 1922, this article was presented, in which are pointed out the possibilities of avoiding fume and dust nuisances by the adequate installation of fans, ducts, etc., in order to remove the fume and dust at its source. The frequent advantages of humidification which succeeds in removing dust nuisances, and particularly explosion hazards, are pointed out.

COMMON SENSE IN FACTORY VENTILATION. *C.-E. A. Winslow.* Nation's Health, June 15, 1922, 4, No. 6, 359-360.—It is now universally recognized that the primary aim of air conditioning is to avoid overheating, and to provide a moderate degree of air movement. The causes of discomfort in the ordinary badly ventilated room are heat and stagnation combined in many cases with high humidity—and it is these conditions that must be controlled in the factory.

It has been shown that even a temperature of 75° F. exerts a profound influence upon body temperature, blood pressure, and heart rate; that it reduces efficiency, and tends to increase the prevalence of respiratory disease. Under conditions comparable to those of the factory the amount of physical work performed in a given time is 15 per cent. greater at 68° than at 75°. Statistics show that the temperature in factories is apt to be above the most favorable point, and that the loss in human vitality and productive efficiency due to overheating of the factories of the United States must be great.

The first step toward improvement is to understand the conditions. When the temperature is found to exceed 68° in the ordinary factory workroom something is wrong, and nine out of ten times the remedy is the application of common sense. An essential part of the duty of the foreman should be to place a thermometer in every workroom and make periodic observations. If the control of direct and indirect heating is not sufficient by itself to maintain a low temperature, window ventilation may be resorted to as the next step. If the room is large and crowded it may be necessary to adopt the three devices that have been found so useful in the ventilation of school rooms: the location of radiation units under the windows to temper the incoming air; the admission of air over slanting window boards to avoid drafts on those nearby, and the provision of a gravity exhaust duct for the removal of vitiated room air near the ceiling. In some cases, where conditions are especially difficult to control, a ventilating engineer needs to be consulted, and resort may be made to fan ventilating systems.—G. E. Partridge.

SIMPLIFYING HEATING SYSTEMS. *R. J. Snell.* Factory, Sept., 1922, 29, No. 3, 260.—An account is presented of the effective heating and ventilating system in use at the shops of the Milwaukee Locomotive Manufacturing Company, whereby heated, fresh air enters by a system of overhead sheet-iron piping and is driven to all parts of the shop by two large fans. Heat is produced by a group of steam coils about 16 feet square and 12 feet in height. Air reaches these coils from two sources: through a lattice-work which may be opened or closed as needed, and through tunnels running beneath the plants. All air is returned still partially warmed, to be reheated and sent back over the plant.

The fans draw the air from each of these sources through the steam-heated coils and drive it through the large overhead sheet-iron pipes back into the plant. The sheet-iron pipe grows gradually smaller as each exit of air is reached, thus insuring an even flow of air throughout its length. Each exit for air is provided with a damper which may be operated by the workmen in the particular area being heated. One advantage of this system is that in summer, when fresh air is needed, the fans are so located that this air may be drawn in directly.

INDUSTRIAL MEDICAL SERVICE: MEDICAL DISPENSARIES AND HOSPITALS IN INDUSTRIAL PLANTS

HEALTH SERVICE FOR SMALL PLANTS. *C. F. N. Schram.* Hosp. Management, Aug., 1922, 14, No. 2, 58-59.—Many employers of small numbers of workers would like to pro-

vide for their employees the best of medical and surgical service, but they cannot employ a full-time physician and they do not understand how to arrange part-time service.

A plan for the required service is outlined by Dr. Shipley under the following heads: (*a*) first aid and emergency measures; (*b*) preventive measures; (*c*) general administrative measures. The first comprises daily visits of the physician or nurse to the factory to attend to emergency cases; arrangements for the necessary hospital care; visits to homes; desired dental service. Under *b* are medical examinations for employment in order to discover and correct defects; periodic examinations to prevent disease; supervision of factory sanitation and hygiene; reduction of industrial health hazards by a study of materials and methods; inspections for the reduction of accidents; the study of methods of work; health education; investigation of home environment; proper recording of services given, with analysis and deductions. Administrative measures include: supervision of the field force of physicians, nurses and home workers; comparative study of data for use by industries; advice and testimony in law suits; following up procedures incidental to the workmen's compensation law; giving advice in respect to industrial health requirements and laws, with supervision of their application in the factories; current information about new laws, latest literature, etc.—G. E. Partridge.

PHYSICAL EXAMINATION OF POSTOFFICE EMPLOYEES. Jour. Am. Med. Assn., Sept. 23, 1922, 79, No. 13, 1058.—At the request of the Postmaster General, boards of medical examiners from the United States Public Health Service in New York and Chicago examined postoffice employees to obtain a survey of health conditions existing in the Federal postoffices in those cities. Only those employees who volunteered were examined, a total of 985, from all the different occupations in the postoffice department. A thorough physical examination was made in each case, and the results were classified. In Class 1 (no physical defects) there were five employees; in Class 2 (minor defects requiring observation or attention) there were twelve; in Class 3 (moderate defects requiring hygienic correction or minor medical, surgical, or dental attention), 258; Class 4 (moderate defects requiring medical supervision as well as hygienic correction), 336; Class 5 (advanced physical impairments requiring systematic medical or surgical attention), 234; Class 6 (serious physical defects requiring immediate medical or surgical attention), 140. The results, compared with those obtained from garment workers, are given. The service is to be extended to all postoffice employees in the country.

MERCANTILE HYGIENE IN THE HEALTH PROGRAM. *A. B. Emmons.* Nation's Health, July 15, 1922, 4, No. 7, 431-433.—Twenty-five stores in six cities, combining two and a half years ago to study the health problems of the store, have now completed a sanitary survey. It has been found that there are defects in nearly all stores, in a sanitary way, but the writer concludes that sanitary conditions, with the possible exception of ventilation, do not form one of the major causes of the large amount of ill health found among workers in stores.

The physical condition of the employees in stores, in comparison with the standard set by college men and women, is in general, far below the average. Kellogg of Pittsburgh found that 95 to 99 per cent. of 1,200 workers in stores considered in groups according to age had from one to five defects—strongly contrasted with the 5 per cent. having defects found in an entering class at Harvard College and the School of Business Administration. The chief cause of this ill-health, the writer concludes, is lack of proper nutrition in the early years, and of training in habits conducive to health.

The most common affections are the common cold and the various diseases of nose and throat, which in their totality are very costly to store and employees. The next most common group consists of cases of malnutrition and indigestion, the problem of which is largely one of education. The group of functional nervous disorders presents an opportunity for intensive study; fear, worry, and anxiety are often found in an exaggerated form in this class of workers. The opportunity is good for studying the beginnings of diseases.

H. W. Stevens, in discussing this paper,

complains that physical examination in industrial groups has proved disappointing. The physical examination does not properly measure capacity, since it seems that it is not the defect alone that disables the worker but what he thinks about the disabling effect of his particular physical ailment. It is to be suspected that the larger part of the illness under discussion falls in the class of functional nervous disorders, and is not to be demonstrated by ordinary physical examination. Study of the statistics in regard to return to work after illness shows strongly the effects of ideas, since the physical condition can hardly be supposed to be subject to such variations as are shown in the figures.

Sickness Records in Preventive Work. *Edgar Sydenstricker.* Nation's Health, Aug. 15, 1922, 4, No. 8, 485-488.—Intelligent health administration in the industrial plant, as in the community, necessarily rests upon a knowledge of what ill-health exists in the plant and of the conditions under which it occurs. At present this information is too often neglected. The industrial medical officer is properly a sanitarian, but the vital statistics and disease records which constitute his epidemiological tools are of a special character. He has little use for mortality records and little need of the ordinary reports on communicable diseases; he is more concerned with indicators of health. Ailments and diseases that do not come to the attention of the municipal and state health officers are the principal objects for preventive work on the part of the industrial physician. To make this preventive work immediately effective, the incidence of symptomatic ailments and disease must be related to as specific conditions as possible.

Several general requirements for industrial health statistics and reports may be stated: (1) In any system of sickness records, provision must be made for expressing the incidence and prevalence of a symptom in terms of rates; every provision for classifying cases into nativity, sex, age, occupational or other groups should be accompanied by a similar provision for classifying all of the employees for whom case records are available. (2) There are certain basic items without which no analysis can be complete, such as items relating to individuals, with a basis of grouping them; items relating to the conditions under which the individual works and lives, items indicating physical condition and health. (3) There should be continued observation of the worker under various conditions, using the record of his deviation from good health as the measure of the influence of conditions after other factors have been taken into consideration. (4) The sickness record of an employee is a dependable measure of his health provided that illnesses of short duration are recorded. The shorter the illness which is recorded with a diagnosis, the more specific is the sickness record. (5) There should be simplicity in the recording and analysis of records. The fewer the facts and the more significant they are, the greater will be the return in knowledge. These methods are already in successful operation in some establishments.

Some practical suggestions in regard to details of record-keeping are offered, and there are two figures in the text, illustrating methods of co-ordinating data.

Dentist in Factory Saves Employees' Money and Time. Manufacturers' News, Sept. 28, 1922, 22, No. 13, 14.—A large eastern industrial establishment, which has recently installed dental equipment and a dentist in its factory hospital, has reported that a large percentage of its employees had diseased gums or defective teeth and that approximately all employees have availed themselves of dental treatment. It is estimated that the work, if done outside, would have cost the workers approximately $27,500.

About one-fourth of the operations were emergency cases. The lost time saved in the emergency work alone, the company estimates, would amount to about four hours a case. In other words, each emergency treatment, of which there were 6,010, represented a saving of four hours each to the man and to the company. This saving to the employee alone, figuring the average at 75 cents an hour, would amount to $18,030.00, making a total saving to the men of $45,530.00. Assuming that each hour lost was worth in production to the company 50 cents, the saving there amounted to $12,020.00.

Lost time due to sickness was also reported

to have been materially reduced by the dental treatments.—M. C. Shorley.

What Is a Good Plant Hospital? *J. A. Britton.* Nat. Safety News, Sept., 1922, 6, No. 3, 41.—The three units of a hospital are: (1) The surgical division, which should be equipped to take care of both major and minor surgical cases, and include equipment for work in eye, nose, and throat cases. There should be at least one or two beds for observation and emergency requirements, and it may be found necessary to provide baths for treating heat cases, since life depends upon giving treatment immediately. Most modern industrial hospitals should have a complete dental equipment, including a gas machine. (2) The second unit should provide for physical examinations and the care of medical cases, and for this a quiet examination room is the first essential. (3) The third unit is the laboratory, without which satisfactory work cannot be done. The minimum laboratory should provide for the examination of the blood, urine, and sputum, and for X-ray work (this is, however, dependent upon accessibility of other hospitals). All industrial establishments now have in addition to these facilities provision for taking care of sickness insurance cases and compensation cases, and these also require suitable offices. Another thing that must not be forgotten is the necessity for proper care of surgical and medical supplies and records. The location and surroundings of the plant hospital are of the utmost importance; it should be protected from ordinary shop noises and from dust, etc.

The plan of the emergency hospital at the McCormick Works of the International Harvester Company is shown.—G. E. Partridge.

INDUSTRIAL PERSONAL AND COMMUNITY HYGIENE: HOUSING, ETC.

Housing Conditions among Berlin Workmen. Jour. Am. Med. Assn., Sept. 2, 1922, 79, No. 10, 840.—The executive committee of the health insurance society of the city of Berlin has published a report, covering the years 1919 and 1920, on the housing conditions of its insured working-men. Among the interesting statements brought out by the report is the fact that the number of ill working-men living in houses and apartments fronting the street has decreased, while the number of those living in the cheaper rear dwellings and apartments has increased. In 1918 52.14 per cent. of ill employees were living in rear dwellings; in 1919 the number had increased to 53.46 per cent.; and in 1920 to 55.89 per cent. More than 5 per cent. of the patients were lodged in rooms with less than 10 square meters floor space. More than one-third were obliged to share their dwelling rooms with other persons. Even in rooms with only 6 square meters were found patients living with other persons. Approximately 5 per cent. of the patients lived in rooms, the ceilings of which were less than 2.5 meters high, the number of such patients having increased from 929 in 1919 to 1,494 in 1920. Of these dwellings, 39.96 per cent. were in cellars or basements, while 41.83 per cent. were in attics, which is especially significant in view of the fact that before the war the use of basements and attics was, for hygienic reasons, prohibited. In 1920, 13.46 per cent. of all patients were obliged to share their lodging with other persons. Twenty per cent. of these patients had some pulmonary affection.—K. R. Drinker.

INDUSTRIAL INVESTIGATIONS AND SURVEYS

An Investigation into Breakage Problems. *G. H. Miles* and *A. B. B. Eyre.* Jour. Nat. Inst. Indust. Psychol., Oct., 1922, 1, No. 4, 132-140.—Breakages of articles such as crockery are usually assigned to carelessness, but this is far from being their true psychological cause. In some cases the worker was not aware of the slightest deviation in the method of handling the article. Sometimes she knew that the accident was about to occur, but felt powerless to prevent it. Conditions tending to induce irritation, excite-

ment or fluster, and those which distracted attention when breakable material was being handled, all tended to increase breakages. Hence the sources of irritation were investigated, and removed whenever possible. For instance, certain articles had to be brought quickly beneath a nozzle, filled, and passed on; by arranging a combined guard and guide, the process was rendered easier, and the clashing of the receptacle against the nozzle avoided. Some of the articles had to be placed in specially constructed racks or carriers. These were improved in form, and rendered easier of access, and workers were taught to combine in their sorting and stacking. The rush period of the day was provided for by the accumulation of sufficient stores, and the allocation of duties and routine. Thereby the flow of materials was smoothed out. Orders were transmitted by calls or a voice pipe, but the substitution of indicators, in which an appropriate button for a particular article had to be pressed, greatly reduced delays and consequent irritation. Workers were screened from undue heat, and the gas consumption in one department was reduced one-half.

The number of articles broken during the working day was investigated, and was found to amount to 2.2, 3.3, 2.2, and 5.7 per 1,000 articles handled during four successive two-hour periods. After introducing the reforms, it amounted to 1.7, 1.8, 1.9, and 1.6 for the respective periods, or to a reduction of 20 to 72 per cent. The workers themselves stated that the work proceeded much more smoothly and easily.—H. M. Vernon.

An Investigation in a Coal Mine (1). *E. Farmer, S. Adams,* and *A. Stephenson.* Jour. Nat. Inst. Indust. Psychol., Oct., 1922, 1, No. 4, 125-131.—Motion study observations were made on coal-getters, especially on the *rhythm* with which they used the pick. The best workers were found to use a comparatively slow stroke in getting coal, and a faster one in getting the harder "dirt" (substance in which the good coal is found) This higher rate for dirt was ascribed to the utilization of the rebound of the pick. Experienced but not very expert miners were taught to adopt a rhythm more in accordance with that of the better workers. This was done by getting them to work to the beating of a metronome, until they acquired the correct rhythm. The miners were taught to use a heavier pick for coal-getting, and a lighter one for dirt. Reliable results showed that in consequence of the adoption of these methods, output increased from 6 to 10 per cent., and in one case, 20 per cent. The experimental periods lasted from six to ten weeks before training, and from four to ten weeks after it. The miners expressed themselves satisfied with the new method of work, as they found it easier and smoother. Other difficulties in coal-getting are under investigation.—H. M. Vernon.

Notes on the Lay-Out of a Hand-Compositor's Case. *Sheila M. Bevington.* Jour. Nat. Inst. Indust. Psychol., Oct., 1922, 1, No. 4, 141-151.—The types in a hand-compositor's case were arranged on a new principle, in order to facilitate access, and to diminish the extent of movement necessary for the transference of type to the composing stick. In comparison with the "Caslon New Lay," which is claimed to be a great improvement on the "Old Lay," the method suggested reduced the average distance travelled by the right arm by 19 per cent. The relative frequency of the letters used was first determined by analyzing representative tests. The logotype combinations, such as "ff" and "fi," were discarded, and were replaced by the logotypes "the" and "and." The actual time saved by the revised lay is not likely to be so great as that corresponding to the diminished movements, since a good deal of the total time taken is occupied in picking up type, and placing it. The method ought to be tested practically on two groups of compositors, trained on the two lays.

INDUSTRIAL PSYCHOLOGY AND INDUSTRIAL MANAGEMENT IN ITS HEALTH RELATIONS

State Institute for the Study of Efficiency Engineering and Industrial Hygiene. Jour. Am. Med. Assn., July 22, 1922, 79, No. 4, 318.—A recognition of the impor-

tance of industrial psychology, which, owing to the influence of propaganda from America, is coming to the front here more and more, is the underlying factor that has induced the head committee of the Prussian legislature to adopt unanimously the suggestion of the minister of public welfare that a state institute for the study of labor problems and industrial hygiene be created. The need of applying psychologic principles to all industries was discussed at length, and special reference was made to the excellent results secured in America by the introduction of a practical system of psychology—more particularly, the Taylor system. The Greater Berlin Street Railway Company, by training motormen in accordance with modern psychologic, scientific principles, effected a saving of 12,000,000 marks for the last fiscal year, while the number of accidents was also materially decreased. With greater efficiency, a saving of 10 per cent. in the amount of electric current required was brought about, and the wear and tear on the rolling stock and the roadbed was distinctly reduced. Another great gain lay in the fact that with the application of scientific, psychologic principles the motormen and conductors could be trained for the work in one-third the time formerly required.—K. R. Drinker.

SOME BUSINESS APPLICATIONS OF A MENTAL ALERTNESS TEST. *A. W. Kornhauser.* Jour. Personnel Res., July, 1922, 1, No. 3, 103-121. —This is a report of methods used and results obtained in some tests of general intelligence made in business establishments during 1919 and 1920. The tests employed were the Scott Company mental alertness tests, which are comprised of tests of arithmetical reasoning, of finding the opposites of given words, of seeing relationships between certain words, counting cubes in pictures, rearranging letters to form words, and solving problems of combining coins. The tests showed high correlation with ratings made by supervisors. Tests made in the educational department of a large plant showed that an examination lasting only twenty minutes approached closely the estimates formed on the basis of school experience, etc. Mental alertness tests were given to 122 foremen taking a course in factory management and modern production methods, and comparison was made with the marks obtained in the course. Similar results were obtained. Tests given to 311 male office employees and 400 female office employees revealed a striking superiority of the men, although men and women students in a co-educational college showed no significant difference in standards. Standards of several occupational groups were determined. Other tests have been made to compare applicants for positions in certain occupations with employees in the same occupation, to compare office employees of different companies, and to determine the relation between mental alertness and turnover.—G. E. Partridge.

INDUSTRIAL HEALTH LEGISLATION: COURT DECISIONS: WORKMEN'S COMPENSATION AND INSURANCE

THE ACUTE PAINFUL BACK AMONG INDUSTRIAL EMPLOYEES ALLEGING COMPENSABLE INJURY. *Harold R. Conn.* Jour. Am. Med. Assn., Oct. 7, 1922, 79, No. 15, 1210-1212.—The author sums up his paper in the following conclusions:

Trauma is blameless as an etiologic factor in a large percentage of cases of alleged traumatic backs.

Malingering is of uncommon occurrence, but often is implied to the surgeon by the patient's false conceptions of etiology and an overanxiety to establish the recognition of a real disability.

Osseous abnormalities in the lower portion of the back furnish a potential group, especially susceptible to violence but capable of developing disability unexcited by trauma.

Sacro-iliac relaxations are of infrequent occurrence.

Sacrolumbar lesions are properly of two classes as regards the involvement of the articulation, extrinsic and intrinsic, the latter representing the grave traumatic lesions of most common occurrence.—K. R. Drinker.

MEASURING END-RESULTS AFTER INJURY: A SUGGESTED PERCENTAGE BASIS. *John J. Moorhead.* Jour. Am. Med. Assn., Sept. 2, 1922, 79, No. 10, 824.—Surgeons are often called on to determine the end-result of a given injury so that legal, compensation, or insurance phases may become a matter of record or a subject of review by constituted authorities. With this fact in mind, the author submits a simple plan, based on three main elements—function, union, and contour—to determine by a percentage basis the outcome of injuries.—K. R. Drinker.

REHABILITATION OF DISABLED EMPLOYEES

PHYSICAL REHABILITATION IN INDUSTRY. *Oscar M. Sullivan.* Nation's Health, Sept. 15, 1922, 4, No. 9, 560-561.—In this paper the author discusses the relation which should exist between systems for vocational rehabilitation of injured persons and the agencies for physical rehabilitation. In the author's opinion, sound policy dictates an advisory relation to physical rehabilitation upon the part of the vocational rehabilitation system, rather than a relation of direct management. It should be the function of the vocational rehabilitation system to understand all the existing provisions for physical care and to bring the injured person in touch with the proper agencies for treatment or prosthesis at the proper time.—K. R. Drinker.

NEW JERSEY INDUSTRIAL REHABILITATION CLINICS. *Lewis T. Bryant.* Nation's Health, Oct. 15, 1922, 4, No. 10, 610-612.—The Rehabilitation Act of New Jersey has been drawn so as to give the Rehabilitation Commission a tremendous latitude in working out its methods. The disabled man, having received such treatment as the Industrial Clinic deems necessary for the most complete physical rehabilitation, is then taken in hand by the Commission, which makes a study of his case to determine what form of work he is most fitted to do. It is the duty of the Rehabilitation Commissioner to keep in touch with the employment officers of the different industries, and thus place each man in that position to which he is most adapted. The Commission must enjoy the confidence of both the laborer and the employer. Indeed it is through strengthening the morale of the worker who is "down and out," that the Commission has rendered its greatest service.

The industrial clinics as they are organized under the foregoing system have proved to be an essential element in the success of this undertaking, since the general hospital lacks the room, equipment, and nursing facilities which are called for by industrial rehabilitation cases.—L. A. Shaw.

THE TREATMENT OF INDUSTRIAL ACCIDENTS. *James R. Kerr.* Brit. Med. Jour., Aug. 26, 1922, 2, 377-380.—Dr. Kerr, surgeon to the Pilkington Special Hospital, St. Helens, an institution devoted to after-treatment of industrial injuries by physiotherapeutic methods, read this paper before the British Medical Association. As this hospital is probably the largest and best equipped of any in the country for its particular purpose, the views expressed are not only interesting in themselves but are particularly so on account of the author's extensive practical experience. He expresses a high opinion of first-aid and ambulance methods and of the universal availability of well-equipped hospitals for early treatment, but considers that the latter could never supply the needs for specialized after-treatment. The variety and severity of factory accidents bear close comparison with those of modern warfare, and the treatments which have proved to be of greatest value to the victims of the latter should be available for any requisite period for those suffering from industrial injuries.

Dr. Kerr explains at some length the course of treatment at this institution. The doctor referring the case, and probably the doctor acting for the employer or insurance company, supply the necessary preliminary information in reports. The examination includes a detailed measurement of the range of movement of each joint, including phalangeal; the state of any nerve lesion is carefully investigated; stereoscopic X-ray photographs

are taken as well as frequent ordinary photographs and plaster casts for purposes of comparison. Where any operative measures are found necessary as a preliminary to special treatment these are carried out. The equipment includes a hall for mechanotherapy fitted up with appliances for helping the movements of stiff joints and the development and re-education of injured muscles. All these mechanisms are finely poised and are capable of delicate and gradual adjustments to suit individual cases. The hall for hydrotherapy contains a warm pool, 36 feet long by 20 feet broad, maintained at a temperature of 98°F. and kept in a state of turbulence by forcing in great volumes of compressed air through orifices in side pipes. There are lounge seats for helpless patients. This hydro massage has been found very useful in encouraging active movements in hip and shoulder joints. An adjoining room contains an ample supply of multiple baths for arms and legs. In the thermotherapeutic department there are asbestos-lined cabinets for enclosing the parts under treatment, these being supplied with hot compressed air, at a temperature of 250° to 300° F., through regulated electric heaters. There is also a room for electrotherapy.—W. F. Dearden.

ABSTRACT OF THE LITERATURE
OF
INDUSTRIAL HYGIENE

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GENERAL

THE SCOPE OF THE PROBLEM OF INDUSTRIAL HYGIENE. *Alice Hamilton.* U. S. Pub. Health Ser., Pub. Health Rep., Oct. 20, 1922, 37, No. 42, 2604-2608.—The fields which have been surveyed in the United States include certain of the poisons and very few of the dusts; the organic dusts belong to a field still to be explored. Since the war, the use of benzol in this country has increased enormously, and benzol is definitely poisonous. Yet a thorough investigation of benzol poisoning in the United States is still to be made. Arseniuretted hydrogen is a less familiar poison but may be present in many chemical processes. Adequate ventilation can remove this hazard. Emphasis is laid upon the necessity for studying American men and women and American industry.—B. Cohen.

THE NEED OF EDUCATED PUBLIC OPINION IN INDUSTRIAL HYGIENE. *Rachelle S. Yarros.* U. S. Pub. Health Ser., Pub. Health Rep., Oct. 20, 1922, 37, No. 42, 2636-2639.—All groups, employers, employees and the neutral public, need to be educated with respect to the facts and ideals of industrial hygiene before rapid progress can be expected.

THE RESPONSIBILITY OF THE WORKER IN PROMOTING INDUSTRIAL HYGIENE. *M. Grace Burnham.* U. S. Pub. Health Ser., Pub. Health Rep., Oct. 20, 1922, 37, No. 42, 2618-2621.—A description is given of the Workers' Health Bureau, which is a co-operative trade-union health-research agency. The plan of the bureau is to gather information on specific trades for trade unions and to plan a preven-

tive industrial health program to serve the worker the remainder of his life.

THE RESPONSIBILITY OF THE EMPLOYER FOR THE HEALTH OF THE WORKER. *E. C. Jackson.* U. S. Pub. Health Ser., Pub. Health Rep., Oct. 20, 1922, 37, No. 42, 2613-2618.—The employer should provide suitable, safe, healthful buildings as work places, and well-guarded machines and suitable tools. He should (1) see that all body and health hazards are reduced to a minimum; (2) choose intelligent and sympathetic foremen, who can give the workers the personal contact so necessary for contentedness and efficiency; (3) make an effort to place workers at tasks that suit them mentally as well as physically; and (4) spare no effort to protect the workers from communicable diseases. The prevention of disease through physical examinations and through suitable rest periods should also not be overlooked.

THE FUNCTIONS OF THE UNITED STATES PUBLIC HEALTH SERVICE IN THE FIELD OF INDUSTRIAL HYGIENE. *L. R. Thompson.* U.S.Pub. Health Ser., Pub. Health Rep., Oct. 20, 1922, 37, No. 42, 2631-2636.—The Public Health Service is the agency that can most economically co-ordinate the practice of industrial hygiene in industry, city, state, and nation. Industrial laws of different communities are different. Which is the best code is a matter for investigation best performed by a central federal agency. The laboratory investigation of industrial poisons and diseases, and consulting service to industry are other fields for usefulness of the Public Health Service. Supervision over government employees by the Public Health Service for purposes of detecting industrial disease, for purposes of determining disability compensation, and for first aid would be a great step forward. This phase requires authorization by law.

CONFERENCE OF WOMEN'S ADVISORY COUNCIL TO THE UNITED STATES PUBLIC HEALTH SERVICE ON THE SUBJECT OF INDUSTRIAL HYGIENE. U. S. Pub. Health Ser., Pub. Health Rep., Oct. 20, 1922, 37, No. 42, 2601-2644.—The aim of this conference was threefold: first, that the various national organizations of women might understand the work being carried on by the Public Health Service; second, that the Public Health Service might know what was being done by the national organizations; and third, that through mutual knowledge a clear understanding of each other's aims and a co-ordination of programs might be reached.

Briefly, the plan of work consists of investigation of the amount of time lost by illnesses; classes of diseases prevalent among employees; the connection between certain occupational groups and certain diseases; and the underlying cause of work processes which contribute to the diseases.

It consists further of the study of compensation paid to government employees, including (*a*) a comparison of the amounts of compensation paid in different bureaus of the government per thousand employees; (*b*) a study of the diseases or injuries for which compensation is paid; and (*c*) a study of the work processes in different bureaus and their special relation to compensable disability.

Lastly, it consists of an establishment of dispensaries for emergency treatment, and the treatment of beneficiaries of the United States Employees' Compensation Commission.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

STUDIES IN CARBON MONOXIDE ASPHYXIA. II. THE GROWTH OF NEUROBLAST IN THE PRESENCE OF CARBON MONOXIDE. *H. W. Haggard.* Abstracted as follows from Am. Jour. Physiol., 1922, 60, 244, in Med. Science, Oct., 1922, 7, No. 1, 70.—By experiments on *in vitro* cultures it was shown that carbon monoxide by itself has no ill effect upon growing nerve-cells, even in concentrations of 79 per cent. It is in this respect as neutral as nitrogen. Its toxic action on the body as a whole is due solely to the asphyxia resulting from its combination with hemoglobin. Illuminating gas, however, contains, in addition to carbon monoxide, another toxic substance, for it is toxic to neuroblast cultures in concentration of as little as 0.1 per cent.

It is specially stated that this observation is

not to be interpreted as weighing against the view that the toxicity of illuminating gas on the entire organism is due to the carbon monoxide and the asphyxia which it produces.

SUFFOCATING GASES AND THEIR ANTIDOTES. *C. J. Van Nieuwenburg.* Abstracted from Chem. Weekbl., 1922, 19, 326-333, in Chem. Abstr., Oct. 20, 1922, 16, No. 20, 3518.—Nieuwenburg reviews the development of the manufacture of suffocating gases and of protective masks, and explains their application during the war.

THE RATE OF ABSORPTION OF POISONOUS AMOUNTS OF CARBON MONOXIDE BY THE BLOOD. *A. P. Vale.* Tr. Inst. Min. Eng., 1922, 63, 417-422.—The author, working at the Birmingham Mining Research Laboratory, subjected himself to the influence of measured amounts of carbon monoxide in a closed chamber. Two sets of experiments were carried out: one in which the subject was at rest; the other in which 5,000 foot-pounds of work per minute were carried out on a Martin's ergometer. The conclusions were:

1. Where no work is undertaken in atmospheres containing carbon monoxide up to 0.114 per cent. a maximum of 50 per cent. of the amount inhaled will be absorbed.

2. Where work is undertaken, owing to the increased frequency of respiration, the actual amount of carbon monoxide absorbed may be from two to four times as much as when at rest.

It follows that no one should go into a suspected atmosphere unless accompanied by a small warm-blooded animal, preferably a linnet. A mouse or bird at rest absorbs carbon monoxide fifteen times faster than a man at rest. In rescue work the man is working, the animal resting. The factor of safety will be reduced by one fourth and when the animal collapses the explorer should return at once.

LATER EFFECTS OF GAS POISONING. *T. W. Sandall.* Abstracted as follows from Lancet, Oct. 21, 1922, 203, No. 5173, 856, in Jour. Am. Med. Assn., Nov. 25, 1922, 79, No. 22, 1882.—In nearly half the cases (46 per cent.) investigated by Sandall there is evidence of emphysema or chronic bronchitis or both. In his opinion pulmonary tuberculosis is not a common effect of gas poisoning, and certainly not one of its later effects. In nearly half the cases (45 per cent.) there is definite tachycardia. In 85 per cent. of these tachycardia cases no sign of anything abnormal was found on examination of the heart. The persistence of gastric symptoms raises the question of organic or functional causation. Another interesting point is the pain in the chest of which complaint is so frequently made. Is such pain any evidence of myocardial involvement, or is this also merely a functional manifestation? With reference to prognosis, more especially in those cases in which physical signs are absent or very indefinite, Sandall asks, does the element of "pension" operate as a factor in the causation or continuance of symptoms?

A CASE OF PARALYSIS OF AXILLARY NERVE AS THE RESULT OF CARBON MONOXIDE POISONING. *Ernst Mendel.* Klin. Wchnschr., April 1, 1922, 1, No. 14, 685.—Dr. Mendel reports a case of paralysis of the left axillary nerve in a young married woman brought to the hospital in coma from carbon monoxide poisoning. Movement of the left arm was normal after resuscitation, but in several days weakness developed as a result of paralysis of the middle deltoideus. There was no local tenderness and galvanic reactions were normal. After six weeks of treatment with electrotherapy and hydrotherapy, movement was again normal. In the author's opinion the paralysis is a purely toxic one.—J. W. S. Brady.

CHRONIC CARBON MONOXIDE AMBLYOPIA. *Henry M. Thompson.* Colo. Med., July, 1922, 19, No. 7, 145-147.—This article presents a confused idea concerning the action of carbon monoxide. A short general discussion is followed by the report of a case of impaired vision in a garage worker. Several inaccurate statements occur, as, for example, that 4 per cent. carbon monoxide is fatal to man in an hour (this is ten times the fatal dose); also, that carbon monoxide forms a reasonably stable compound with hemoglobin. Physiologists well know that this compound is not stable and that oxygen replaces the attached carbon monoxide in accordance with known physical laws when the patient breathes fresh

air. In the case reported it is pure assumption to state that carbon monoxide was the cause of the impairment of vision.—H. S. Forbes.

TESTS OF GAS MASKS AND RESPIRATORS FOR PROTECTION FROM LOCOMOTIVE SMOKE IN RAILROAD TUNNELS, WITH ANALYSES OF TUNNEL ATMOSPHERES. *A. C. Fieldner, S. H. Katz,* and *S. P. Kinney.* U. S. Bur. Mines, Tech. Paper 292, April, 1922.—It is shown that the objectionable or dangerous constituents of locomotive stack gases are carbon monoxide and sulphur dioxide which, coupled with the high temperature and high relative humidity frequently encountered in tunnels, often cause serious consequences and even fatalities.

Samples of tunnel air were taken under the most severe working conditions to which engineers and firemen are often subjected. The analyses showed that carbon monoxide in one instance reached a figure of 0.12 per cent., at which it caused marked discomfort but was not dangerous when breathed for only a short time.

Sulphur dioxide was found in one instance to be as high as 110 parts per million, but was usually found in smaller quantities. Because temperatures as high as 131° F. were found in the cabs of locomotives, the authors suggest that these temperatures, together with the exhaust steam from the locomotives, may have been the cause of frequent accidents due to inadequate tunnel ventilation.

The authors, a number of engineers, firemen, and trackworkers, tested several types of gas masks. Men doing vigorous work seemed to favor the light gas masks with canisters of about one-fourth the capacity of the canisters in the usual army gas mask. For absorbents the canisters were provided with charcoal and soda-lime which gave adequate protection against sulphur dioxide and smoke. For tunnels in which a high carbon-monoxide content is feared the authors suggest the use of canisters containing hopcalite, a mixture of the oxides of manganese, copper, silver, and cobalt. Either electric locomotives or forced ventilation are suggested as the most effective cure for the extreme conditions occasionally encountered.

Several illustrations and drawings of gas masks are included in the paper, and a bibliography is appended.—Philip Drinker.

DUST HAZARDS AND THEIR EFFECTS

ATMOSPHERIC DUST. *J. S. Owens.* Jour. Soc. Chem. Indust., Oct. 31, 1922, 41, No. 20, 438R-443R.—This paper, read before the chemical section of the British Association at Hull, is a discussion of atmospheric dust from the standpoint of meteorology. The author deals principally with dust in its relation to atmospheric pollution, the cause of hazes, fogs, etc.; he furnishes data obtained by the use of his instrument (to be described in an early issue of THIS JOURNAL) regarding the size and identification of both soluble and insoluble dusts of which the particles are less than 1 micron. The usual size of fog particles (soot) was found to be about 0.5 micron. Data indicate that volcanic dust is a probable cause of haze in certain localities, and show the distances through which volcanic dust has traveled. The author suggests using his instrument for calibrating the efficiency of air washers but gives no data regarding its use therefor. Because of its sensitiveness this instrument is poorly adapted to counting particles of appreciable weight in volumes of air.—Philip Drinker.

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

ANNUAL REPORT FOR THE YEAR 1921 OF THE SOUTH AFRICAN INSTITUTE FOR MEDICAL RESEARCH.—This report contains a summary of the work carried out during the past year. Particular attention may be drawn to further inquiries into infective silicosis:

Animals that had been exposed to dust of coal or silica were given intraperitoneal inoculations of the bacillus tuberculosis, as to one series, and intratracheal injections of streptococci and pneumococci as to another. Control animals that had not been exposed to

dust were given corresponding inoculations or injections.

The animals that had been exposed to coal and then inoculated with bacillus tuberculosis all died of generalized caseous tuberculosis, the lungs being grossly involved. Observers have recorded that animals that have been exposed to coal dust and then inoculated with bacillus tuberculosis die of tuberculosis but that the lungs escape. The animals subjected to intratracheal injections of streptococci or pneumococci after exposure to inhalations of coal dust either died of pneumonia within forty-eight hours or recovered completely. The results were similar to those in the controls in both cases.

The animals that had been exposed to inhalations of silica dust and then inoculated with bacillus tuberculosis reproduced miners' phthisis very closely. They died of tuberculosis, with bulky lungs, thick pleurae, and well-marked fibrosis; the tuberculous lesions, however, were generalized throughout the body. Perhaps the most striking feature was the rapid development of fibrosis. In animals that have been merely exposed to the inhalation of silica dust the fibrosis is not detectable until about seven months after commencement of exposure, but if a tuberculous infection is added fibrosis can be detected within five weeks, and is far more marked at death than in animals that have merely received a tuberculous infection.

In the case of animals which received intratracheal injections after "dusting" with silica, three died within forty-eight hours, and three at the end of about seven months. The latter died of a chronic, unresolving pneumonia.

All the foregoing experiments were performed upon guinea-pigs.

A somewhat similar series was carried out with rats, more especially with a view to learning whether exposure to silica dust would influence the relative immunity of these rodents to tuberculosis. The rats exposed to coal dust, and the controls, did not develop tuberculosis after inoculation. Four out of six rats which had been exposed to silica dust died of tuberculosis of the lungs, without tuberculous lesions elsewhere in the body.

ANTHRAX. *R. F. Vaccarezza et al.* Abstracted as follows from Semana méd., June 29, 1922, 1, No. 26, 1081, in Jour. Am. Med. Assn., Oct. 28, 1922, 79, No. 18, 1557.—This is the concluding instalment of this detailed report of extensive experience with treatment of anthrax by specific antiserum, normal beef serum and peptone. The writers are convinced that serotherapy is merely a form of protein therapy, and hence that any protein would probably answer the same purpose. Peptone is free from the disadvantages of other proteins, and their tabulations show that it is fully as effectual as the specific antiserum.

THE SERUM TREATMENT OF ANTHRAX SEPTICAEMIA. *Douglas Symmers.* Ann. Surg., June, 1922, 75, No. 6, 663-667.—The author points out that the pustule of cutaneous anthrax frequently heals spontaneously if it is left to its own devices and not subjected to operation or cauterization, either of which may precipitate septicemia, which is almost always fatal.

The author concludes as follows:

1. Every anthrax lesion of the skin or elsewhere should be tentatively regarded as attended by generalized infection until the result of the blood culture proves the contrary.

2. In no circumstances is it justifiable to tamper with the anthrax pustule. The only permissible form of local treatment consists in the injection at the periphery of the pustule of broken doses of anti-anthrax serum at intervals of four or six hours, each injection not to exceed a total of 10 or 15 c.c. If this is not available, it is better to cover the lesion with a bit of sterile gauze to collect the secretions, but otherwise to leave it alone.

3. The best treatment is, first, to isolate the pustule within a barrier of anti-anthrax serum subcutaneously injected every four hours; second, to inject intravenously, at once, a sterilizing dose of 150 or 200 c.c. of serum, and, third, to supplement this by the intravenous injection of 40 c.c. every four or eight hours. If the blood culture is negative at the end of twenty-four hours, the intravenous use of serum may be discontinued, the local injections being kept up until the pustule is free from bacilli, or at least until involution forms occur in the stained films. In anthrax septicemia, the liberal use of anti-anthrax serum intravenously, if commenced in time, is capable in many instances of steril-

izing the blood with astonishing rapidity, and, in septicemic cases, the routine just outlined may be followed until the blood cultures are negative.

THE PLACE OF VENEREAL-DISEASE CONTROL IN INDUSTRY. *Joseph S. Lawrence.* U. S. Pub. Health Ser., Pub. Health Rep., Oct. 20, 1922, 37, No. 42, 2609-2613.—Venereal disease may be slightly more prevalent among industrial workers than among certain other occupational groups. This increase is not due to their work, but to the unsatisfactory conditions surrounding their efforts at rest or recreation. The diseases occasion only slight economic burden in loss of time when compared with other diseases. Because of its insidious development, however, syphilis may be the cause of many accidents.—B. Cohen.

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

OCCUPATIONAL DERMATITIS. *Frederick Gardiner.* Brit. Jour. Dermat. and Syph., Oct., 1922, 298-320.—This comprehensive paper includes the earlier work published by the writer on this subject, and also contains much new matter. It reviews 621 skin diseases seen by him during the last ten years. All were caused by occupation—domestic, trade, agriculture, etc. The great bulk of this material is drawn from an extensive, but generally speaking, a non-manufacturing area. Discussing the statistics of a single year (1919) he finds that 68 per cent. of all the cases diagnosed as dermatitis, or eczema, were due to occupation. Under this heading the numbers are as follows:

Occupations	No. of Cases
Housewives	254
General laborers	59
General	51
Iron and steel workers	36
Colliery workers	32
Mill workers	26
Chemical workers	25
Rubber workers	24
Bakers	16
Painters and French polishers	14
Agricultural laborers	14
Woodworkers	13
Printers	12
Butchers	12
Tailors	8
Chocolate makers	6
Leather workers	6
Munition workers	4
Linoleum workers	4
Upholsterers	3
Actors	1

Instances are described in detail of persons who have suffered, it may be for years, from some external irritant. This, the author says, so weakens the resistance of the skin, that the individual becomes highly susceptible to a different agent. Once an outbreak has been produced on a skin, it becomes sensitive to an irritant to which it was previously immune.

The whole of his series of cases is minutely analyzed. Separate tables show the different parts of the body affected, the ages at which onset occurs, duration of the attacks, seasonal prevalence, effect of slight alteration in the work, and predisposing causes. All these various aspects of the subject are examined and illustrated but do not readily lend themselves to abstraction. They supply a fund of useful information which no clinician can afford to ignore.

The outstanding feature of Dr. Gardiner's communication is that he has investigated each case from the point of view of the skilled dermatologist. He has endeavored to find out, not only the direct influence of the irritant, but the rôle played by unhealthy states of the body, or of the skin, in promoting the onset of these troubles. He finds that lowered vitality, such as that which follows influenza or pneumonia, accounts for 13.8 per cent. General debility arising from the menopause, old age, or an injury may be the prelude to an outbreak. Further close consideration of his cases reveals to him that a large number are associated with some local morbid condition of the skin. Of these the most common is seborrhea, with 28 per cent. Excessive sweating is the next most frequent concomitant showing 27 per cent. This may result from debility, the hot materials handled, or may be due to some unknown, or inherent peculiarity.

In the final review of his figures he sums up these significant factors. He says that "77.4 per cent. of these patients suffered from a preceding skin affection, or general illness.

. . . This percentage is a very high one indeed and it provides food for reflection." It is certainly true that an ordinary report upon an occupational dermatosis rarely alludes to a preceding illness, the texture, or pathological state or tendency of the individual skin. The reason is not far to seek. The usual observer is not necessarily or even generally an expert or one specially trained in this line of inquiry. Gardiner feels from this standpoint that the professional disorders of the skin have been neglected by previous investigators. These considerations urge him to stress the great necessity that exists for a much more thorough examination of candidates for various trades, especially where the applicant is to be exposed to the known skin irritants.

He concludes as follows:

a. There are definite occupations which are liable to cause damage to the skin.

b. Some irritants act mechanically and others act chemically.

c. Alterations in the materials used may cause the development of a dermatitis in the case of a worker employed for many years at the same occupation.

d. A previous dermatitis may subsequently render a worker susceptible to an irritant which he or she could previously resist.

e. It is characteristic of occupational dermatitis that it occurs on the parts exposed to the irritant; the majority of cases occur on the hands, and next in order of frequency on the arms, face, neck, and lower extremities.

f. Spread may be from the irritant itself, or may be due to secondary infection.

g. The attack may commence in youth, but if not it is more common in persons over 40 years of age.

h. The recurrent type is an exceedingly common one.

i. Dermatitis, in the case of a powerful irritant, may ensue within a day or two; where there is hyperidrosis it is likely to appear within a few weeks; where there is seborrhea there is a more gradual breakdown, maybe over months or years; the largest number occurs after many years, owing to various causes.

j. Illness, the climacteric, and old age are important points in the causation of an outbreak.

k. Local injury is also an important factor.

l. The condition of the skin should be a matter of close examination in all applicants for occupations which incur liability to dermatitis.—R. P. White.

THE OCCUPATION DERMATOSES OF THE PARAFFIN WORKERS OF THE SCOTTISH SHALE OIL INDUSTRY. *Alexander Scott.* Brit. Med. Jour., Aug. 26, 1922, 2, No. 3217, 381-385.—Dr. Scott describes the skin lesions due to contact with oily paraffin in a crude or semi-refined state as conforming to the following types, of which only one or several might be found on the same individual:

1. Occupation comedones.
2. Folliculitis and follicular dermatitis.
3. Dermatitis pustulare.
4. Dermatitis papulare (erythema papulare).
5. Erythema simplex.
6. Dermatitis erythematosa.
7. Epithelioma (paraffin workers' cancer).

1. Comedones occurred in parts exposed to contact, especially over the flexures and posterior aspects of the elbows, upper aspects of shoulder joints, and occasionally over the knees. Their origin was due to obstruction of the sebaceous ducts with semi-solid paraffin substances, or to thickening of the superficial layers of the epidermis. They were larger than ordinary, more closely packed together, and confined to circumscribed areas. The outer layers were pigmented and hardened. They were easily expressed, but if left alone were apt to be followed by the development of sebaceous concretions of a cystic nature, most commonly over the flexures of the elbows. There was not the ordinary tendency to acne formation, possibly owing to the fact that the obstructive material was sterile and practically antiseptic.

2. Folliculitis involved destruction of the hairs and hair follicles as the result of a mild inflammatory reaction set up by the action of shale oils. Occasionally a slight perifolliculitis occurred, in which the inflammatory condition extended to the surrounding skin, which became slightly raised and ultimately somewhat indurated and thickened. The common sites were the backs of the fingers and hands, and to a less degree the forearms, the ankles, and the dorsal aspects of the toes and feet, especially on the line of the extensor tendons of the toes. There was never any tendency toward suppuration or sloughing, the

condition described persisting indefinitely. Dryness of the hands, with clusters of black points on the backs of the fingers and hands was characteristic.

3. Two types of pustular dermatitis have been observed: one, affecting the hair follicles of youths recently commencing work among semi-refined oily paraffin, in which the condition was characterized by the appearance of numerous small pustules over the anterior aspect of the body and limbs; the other, in association with the typical papular eruption, due to the breaking down of the papule from coccal infection.

4. The papular variety was by far the most common type of skin lesion met with among paraffin workers in the Scottish shale oil industry, between 40 and 50 per cent. being affected. The papules were known in the trade as "paraffin plukes," and were most typical of an occupational condition both in history and distribution.

The eruption consisted of small rounded elevations of a reddish color, varying in size from that of a small peppercorn to that of a small pea. They corresponded in every way to typical papules, being solid, superficial, rounded, and containing no fluid. As a rule the tops were convex, but occasionally there was a minute central depression, corresponding to a necrosed hair follicle or sweat duct, from which a tiny thread-like core could be expressed or removed.

The entrance of the irritant to the superficial layers of the skin appeared to be most commonly through the sweat ducts, but frequently the hair follicles were involved, in which case they occupied the center of the papule. There was, as a rule, no inflammatory areola around the typical papule. The condition differed from other lichenoid eruptions, in that there was no itching or irritation; the papules did not tend to coalesce, and as a rule healed spontaneously. The extent of eruption varied, but in half the cases only a few papules were to be found and only 5 per cent. showed a diffuse character.

The distribution was very typical. In the great majority of cases it was confined to the forearms and was most pronounced over the ulnar aspects. The palms of the hands and soles of the feet were never affected. Approximately 75 per cent. of those affected had an eruption on the hands and arms only; 20 per cent. had both arms and legs affected; and about 5 per cent. had some eruption on the body, as well as on the arms or legs.

The earliest appearance of papules occurred in from ten to twelve days after work in the paraffin sheds was begun, and they might persist throughout the duration of employment. They disappeared a few weeks after work among the semi-refined paraffin had ceased. Occasionally in old-standing cases the papules, instead of healing, assumed a warty appearance. This condition might spread until it assumed the clinical and pathological features of an epitheliomatous growth.

5. Mild erythema, in which the redness was distributed uniformly over the parts affected, disappearing on pressure at first but later becoming permanent, was almost always limited to the forearms, but in exceptional instances and to a slight degree had been seen on the feet. There were marked dryness and scaliness of the skin and frequently a polished appearance; irritation was uncommon. The whole condition might persist for years without alteration.

6. Dermatitis erythematosa was essentially of a subacute or chronic type, due to the irritant action of semi-refined paraffin on the tissues of the skin prolonged over a lengthened period—for years in practically every instance. It represented a further extension of erythema, in which the congestion, after merging into a chronic inflammation of the various layers of the epidermis and cutis vera, was followed by induration and, in the most advanced stages, by partial or complete destruction of small areas of the affected skin. It was mostly associated with the papular eruption.

In an advanced stage the forearms showed pigmented patches, small white areas of atrophied skin, scars, scaly warts, and indurated papules. The condition had become less evident and was practically confined to those who had been paraffin workers for years.

7. Epithelioma as seen in the Scottish oil industry occurred in workmen about or over middle life who had been paraffin workers for long periods of time. It usually arose from a scaly wart formed as a result of the chronic dermatitis already described, or from an old papule of the indurated type. In the benign condition the wart was somewhat oval

or circular, about the size of a sixpence and covered by small readily removable scales. As the epithelium underwent proliferation the wart increased in area until it reached the size of a half crown and became raised about a quarter of an inch above the surface. It was then covered with thick horny scales and showed a tendency to the formation of fissures or abrasions, from which a serous fluid exuded and formed crusts on the surface. This appearance persisted for several months, the area gradually increasing until the incrustation and warty covering of the growth eventually sloughed and disappeared, leaving a superficial ulcer, from which serosanguineous fluid exuded.

In an indurated papule a central necrotic area formed, accompanied by the gradual growth of the primary lesion until it assumed much larger proportions than formerly and had a central ulcer, surrounded by indurated edges. The growth of the ulcer extended peripherally and also in depth, the edges being indurated and undermined, until all trace of elevation of tissue above the level of the surrounding skin had disappeared, leaving a large open sore with a base of red, angry-looking granulation tissue which bled profusely at the slightest touch.

When situated on the scrotum, there was usually, in the ulcerative stages, an overgrowth of epithelial tissue forming large protruding masses, giving the appearance of a cauliflower excrescence, and bleeding profusely. Ultimately the lymphatic glands were involved, so that in the latest stages the whole inguinal region was invaded by a large ulcerating cauliflower-like mass. The most common situation was the back of the hand or on the lower third of the forearm, but it did occur on the scrotum, and it had been seen on the face; when at the outer or inner angles of the eyelids, the features of a rodent ulcer might be assumed. Since 1900, sixty-five cases of paraffin epithelioma had occurred in the oil works of Scottish Oils Limited, nineteen being in paraffin workers proper, and forty-six among the other grades of labor. The number of employees being 5,000 the cancer incidence was approximately 1½ per cent. in twenty-two years, or under 0.1 per cent. per annum. Nineteen cases occurred in the same period among the 200 men employed annually in green sheds (paraffin sheds of crude paraffin department), the incidence rate of this condition was thus approximately 0.5 per cent. per annum. In the cases recorded the ages varied from 37 to 79 years.

It was formerly believed that the shale itself was the cause of the dermatitis, but recent experiments with animals have clearly showed the oil to be the agent, though the actual constituent responsible has not yet been determined. Dr. Scott gave reasons why nitrogenous compounds, arsenic, or radio-active substances could not be regarded as causative agents. He suggested that an idiosyncrasy existed toward the action of paraffin substances, and that the personal element was a factor of some importance in the development of warts and papules into epitheliomata.

He mentioned the importance of cleanliness as a prophylactic measure and said that while this had only slightly diminished the incidence of early eruptions, it had brought about a marked decrease of the more chronic types.

Regarding seasonal conditions, the warty excrescences were more numerous during winter and spring than in summer. Concerning protective measures there were adequate facilities for ensuring absolute cleanliness of bodies and clothing, for protecting the exposed parts, and for medical inspection every three months. The best protective application appeared to be castor oil, which, owing to its insolubility in paraffin, provided an impervious covering. No form of clothing has been found to withstand the extremely searching and solvent action of the paraffin series.

The various methods of treatment were purely local, and carried out on ordinary lines. Occupational comedones were readily removed by expression; papular conditions disappeared when work was discontinued, and as a rule required little or no treatment; mild antiseptic pastes, such as boric ointment, sufficed to prevent septic infection. In the more acute erythematous conditions, sedative applications were of use, the most effective being preparations of ichthyol and lead. These, as well as pastes of zinc oxide and salicylic acid, were also useful in chronic types; stronger preparations of the last were needed for wartiness. In the more rapidly proliferative warty conditions, salicylic and chromic

acids readily removed the superficial varieties, but when warts extended more deeply into the skin carbon dioxide snow was better. When warts or nodules proliferated too rapidly, removal by excision was a sure treatment, and it was exceptional to find recurrence.—W. F. Dearden.

Pseudosclerosis with Corneal Pigmentation and a Haze on the Lens Visible only on Oblique Illumination, and Resembling a Condition Produced by the Presence of Copper in the Eye after Perforating Injuries. Abstracted from Klin. Wchnschr., 1922, 1, 1087, in Med. Science, Nov., 1922, 7, No. 2, 148-149.—The authors describe the case of a man of 43, employed in a brewery and in the habit of drinking daily 4 liters of beer and of smoking excessively, who, for six years before the examination now reported, had gradually developed tremor of the head and limbs. At the end of this period he presented a Parkinsonian facies and widespread tremor. Case findings are given. Examination of the eyes showed the presence of the characteristic green-brown pigment ring at the periphery of the cornea, and also a blue-gray haze on the surface of the lens resembling a sunflower in outline. This was visible only on oblique illumination. The authors point out that the lens condition exactly accords with that described some years ago by Purtscher as indicating the presence of minute fragments of copper in the eye in cases of perforating injury, and occurring apart from the presence of copper in the lens itself. Since this haze differed from all other forms of lenticular opacity in being invisible by transmitted light, that is, an ophthalmoscopic examination—Purtscher spoke of it as an "apparent cataract." The scope of the discussion is restricted to German writings only.

OCCURRENCE AND PREVENTION OF INDUSTRIAL ACCIDENTS

"Accident Prevention," a Branch of Welfare Work, II. *D. D. Goldingham.* Industrial Welfare, Sept., 1922, 4, No. 9.—This is the second article of a series. According to the first article, 79.42 per cent of industrial accidents are non-mechanical; hence, if all machinery could be enclosed in cast iron, a large percentage of accidents would still occur. The public are all chance takers. Various causes of accidents resulting from chance taking are enumerated, and attention is drawn to the importance of education of the human factor. The author states that education is the basis of safety. A table of the fifteen most frequent causes of disability among 1,282 office employees of a large manufacturing company for one year is given.—E. M. Hewitt.

Pillarless Electric Miners' Safety Lamps. Miners' Lamps Committee. Iron and Coal Trades Rev., July 7, 1922.—The Secretary of the Mines Department has approved the recommendation of the Miners' Lamps Committee that pillarless lamps should be accepted for the official test for use in coal mines. The Miners' Lamps Committee has experimented with this type of lamp for the last two years and has come to the conclusion that the lamp is safe for underground use and that the proportion of broken glasses is not greater than that of the ordinary type of lamp. In the standard pattern of safety lamp the top of the glass is protected by a metal plate supported on pillars. In the pillarless type the lamp glass is dome shaped and uncovered. The light given is distributed in all directions and is free from shadows.

The lamp is greatly appreciated by those miners who have worked with the lamps during the trials. It is hoped that an improved allround illumination will be obtained.

INDUSTRIAL PHYSIOLOGY: NUTRITION, METABOLISM, FATIGUE, ETC.

Effect of Alcohol on Industry. *Edgar L. Collis.* Indust. Welfare, Sept., 1922, 4, No. 9.—Evidence from America points out that labor turnover is less under prohibition, and

that regularity of attendance is greater. The most important test is the productivity of the workers. Valuable evidence on this point is based on laboratory observations of effects on skilled movements and of efficiency of physical effort. Figures with reference to accidents appear to show a reduction when there is abstinence from alcohol.

Dr. Collis concludes that "industrialism in so far as it has led to bad social conditions and to bad feeding, and has caused over fatigue, has conduced to alcoholism. . . . Alcoholism so caused has reacted and is continuing to react harmfully upon industrial productivity. On the other hand, when, owing to industrial influence, social conditions have been improved . . . industry has exerted, and may continue to exert, a powerful influence in restraining alcoholism within reasonable bounds."—E. M. Hewitt.

TESTS FOR PHYSICAL EFFICIENCY. *W. D. Hambly, G. H. Hunt, L. E. L. Parker, M. S. Pembrey,* and *E. C. Warner.* Guy's Hosp. Rep., Oct., 1922, 72, No. 4, 367-385.—Just as in the case of temperature and other physiological processes, experiments gave no definite normal for the pulse. The average pulse rate is lower for heavier individuals; but weight is not the factor so much as the relation between surface and mass. The pulse of trained persons is definitely slower than that of the untrained. In these tests the average rate per minute for trained men was 61; for untrained, 72; and for unfit, 81. For trained women the average was 75; and for the untrained, 84. The rate varies with age, slowing with advancing years from 71.5 for trained men under 20 years of age to 63.7 for those aged 30 and over. A rise in atmospheric temperature is followed by a rise in pulse rate.

The relation of the pulse rate at rest to that after exercise was carefully studied. The exercise chosen was stepping on and off a stool 13 inches high at fixed rates per minute; then the pulse was taken every thirty seconds for the next two minutes. The pulse-ratio—that is, the ratio between the pulse rate for the two minutes immediately following a given mild muscular exercise and the pulse at rest—was found to be a good indicator of physical fitness. Strenuous exercise, as, for instance, running a mile, produced in the fittest men the greatest percentage rise in pulse rate and afterwards the greatest percentage fall toward the resting value. A low resting pulse rate in an athlete, giving a greater range before the speed limit of the heart is reached, is a great advantage.—E. L. Collis.

INDUSTRIAL FATIGUE AND VOCATIONAL SELECTION ON A BASIS OF PHYSICAL INQUIRY. *David McKail.* Brit. Med. Jour., Aug. 26, 1922, 2, No. 3217, 351-355.—In a discussion on this subject at the recent Annual Meeting of the British Medical Association, Dr. McKail distinguishes between the extreme form of industrial fatigue—which he regards as bordering upon the pathological and due to the continued toxemia resulting in ultimate physical deterioration but from which, owing to improved conditions, the present generation cannot be said to suffer in any marked degree—and the minor form which is more strictly physiological. The effects of the latter are mostly subjective and personal to the worker, and are, therefore, not so easily recognized by the observer as the more severe type. It has thus become necessary to redefine the term, which, in the words of the Health of Munition Workers Committee, now covers "the sum of the results of activity which show themselves in a diminished capacity for work." He outlines the difficulties that arise in attacking the problems as they exist, and proceeds to deal with the relationship to fatigue of (*a*) the hours of labor, (*b*) other conditions of employment, and (*c*) methods of work. Accepting the eight-hour working day, he outlines the following alternative schemes for dividing the twenty-four hours into the most suitable periods for work, rest, nourishment, and recreation, stating his preference for the first arrangement as conforming more to established meal hours.

6 A.M.	Rise, wash and dress; light breakfast	7 A.M.
7 to 9 A.M.	Morning spell of work	8 to 10 A.M.
9 to 10 A.M.	Breakfast and rest pause	10 to 11 A.M.
10 to 1 P.M.	Forenoon spell of work	11 to 2 P.M.
1 to 2 P.M.	Dinner and rest pause	2 to 3 P.M.
2 to 5 P.M.	Afternoon spell of work	3 to 6 P.M.
5 to 6 P.M.	Tea and rest pause	6 to 7 P.M.
6 to 10 P.M.	Rest and recreation	7 to 11 P.M.
10 to 6 A.M.	Sleep	11 to 7 A.M.

Spells of work should be normally from two to three hours in length in all occupations

demanding steady application and attention. In arduous work there must be rest spells after excessive exertions, and the latter must not be unduly prolonged. Confinement and want of variation induce languor and dullness; continuance of work thereafter can only be accomplished by the exercise of superior or excessive mental stimuli, and the resulting fatigue is more slowly recovered from. In arduous work a four-hour spell should not be allowed where labor is continuous.

Definite intervals for meals must be provided. For work starting before 9 A. M., two meal periods should be interposed in the timetable; few persons take a normal amount of food in the morning, and it is too long to work a three-hour or a four-hour spell before again getting food. For the eight-hour day a three-spell day is, therefore, recommended, the first of two hours, and two of three hours each. For a nine-hour day, the first spell may be two and a half hours, and the others three and a quarter hours each. If an industry can give a living wage on shorter hours this should be done, and the morning spell abolished.

An objection to the 7 to 9 A. M. spell is that it increases the stoppages and starts, and working time is always lost at those periods. The main objection to the three-period day with two breaks comes from those who believe that after every start there is a "warming-up" time required, and that the repetition of this results in serious loss of working time.

Conditions of employment, especially in hazardous occupations, should be good; if these conditions cannot be secured, the industry should be suppressed. Methods of work are worthy of study, in order to eliminate waste of energy, to find the best methods, and to avoid harmful movements.

Vocational selection must at present be limited to the "don't" department. Young persons with certain defects should not be permitted to engage in specified employments. —W. F. Dearden.

THE RELATION OF THE ADRENALS TO FATIGUE. *F. A. Hartmann, R. H. Waite,* and *E. F. Powell.* Abstracted as follows from Am. Jour. Physiol., 1922, 60, 255, in Med. Science, Oct., 1922, 7, No. 1, 78.—In cats one adrenal was removed, the other was denervated so that the output of epinephrin was greatly diminished. Such cats often show a period of ill health, indicated by loss of appetite, loss of weight, change of temperament, weakness, and sometimes a subnormal temperature. Their capacity for muscular work is diminished. Observations on normal cats doing muscular work show that an increased resistance to fatigue is associated with an increased output of adrenalin, as indicated by the denervated pupil reaction.

Adrenalin plays, therefore, an important part in increasing the capacity for muscular work and delaying the onset of fatigue.

HAZARDS OF COMPRESSED AIR, DIMINISHED PRESSURE, GENERATION AND USE OF ELECTRICITY, AND ELECTRICAL WELDING

COMPRESSED-AIR ILLNESS AND ITS ENGINEERING IMPORTANCE WITH A REPORT OF CASES AT THE EAST RIVER TUNNELS. *Edward Levy.* U. S. Bur. Mines, Tech. Paper 285, Feb., 1922, pp. 48.—Compressed-air illness, or caisson disease, is caused by too rapid a decompression after exposure to high pressures for a period of time.

The author depicts in detail the engineering, clinical, and physicochemical aspects of compressed-air illness. Statistical data are used to show how essential slow decompressions are. New York State regulations are given as illustrations of the necessity of having short labor shifts and long rest periods for men working under high pressures. The paper is well illustrated and contains a considerable bibliography.—Philip Drinker.

DISCUSSION ON THE PATHOLOGICAL CHANGES PRODUCED IN SUBJECTS RENDERED UNCONSCIOUS BY ELECTRIC SHOCK. Abstracted from Proc. Roy. Soc. Med., 1922, 15, 45, in Med. Science, Oct., 1922, 7, No. 1, 88.—Legge said that it was necessary to find out whether the instructions for the treatment of persons suffering from electric shock issued under the Factory and Workshop Act were sufficient, in view of the knowledge acquired since the work of Prevost and Batelli in 1899. In 1918

Professor Boruttau attacked the apparent-death theory of Jellinek, using the statistics from the German factory inspectors' reports, which showed that artificial respiration was unsuccessful. Levy said that most observers agreed that currents of 1,200 volts and over, if passed from head to foot, did not affect the heart, but did affect it when passed through the thorax. The effect of shocks from a condensor was not cumulative, since a single shock would cause fibrillation if passed in at the exact moment of the cessation of the refractory period. He referred to the continuance of respirations after the heart had stopped beating. He believed spontaneous recovery in man was not uncommon but could not occur later than about two minutes after the onset of fibrillation. Massage of the heart was a certain means of restoring its action, but must be carried out within five minutes. If respiration were paralyzed without the heart being affected, then prolonged artificial respiration was indicated: as both heart and respiration might be affected, he advised artificial respiration on the remote chance of spontaneous recovery of the heart. He also spoke of disengaging a person from a live wire with the foot and not the hand. Spilsbury said that it was nearly always possible to determine the points of entry and exit of the current postmortem. He referred to the usual postmortem findings and gave suggestions as to the cause of death. MacWilliam said he had found two modes of immediate death: (1) arrest of respiration from paralysis while the heart continued to beat; (2) fibrillation of the ventricles. He referred to the relative frequency of these two types of death. He also advised artificial respiration in all cases and stated that massage of the heart was also of great use, especially if accompanied by the intravenous injection of drugs, several of which he mentioned, with the dose to be employed.

INDUSTRIAL SANITATION: FACTORY CONSTRUCTION, ILLUMINATION, VENTILATION, HEATING, WATER SUPPLY, SEWAGE DISPOSAL

THE MEASUREMENT OF HUMIDITY. *Ezer Griffiths.* Abstracted from Beama, 1922, 11, 530-537, in Chem. Abstr., Nov. 10, 1922, 16, No. 21, 3573.—Griffiths investigated the various methods of measuring humidity in connection with a food research. His preliminary report is submitted. The full report will be published as Special Report 8, Nat. Phys. Lab., London. During the last one hundred years no fundamentally new method of hygrometry has come into general use. The psychrometer is well adapted in situations where there is a forced draft of air. The dew point apparatus has a sound theoretical foundation and can be easily manipulated at low temperature. It is the most convenient for use as a standard of reference. An improved Nat. Phys. Lab. form is described in detail. For everyday use the hair hygrometer is preferred as it is direct reading and simple in construction, although it is not as accurate as the other two types.

A NEW DEW-POINT TESTER. *W. Ostwald.* Abstracted from Ztschr. f. angew. Chem., 1922, 35, 443-444, in Chem. Abstr., Nov. 10, 1922, 16, No. 21, 3559.—The apparatus is based on the wet-and-dry bulb principle, the thermometer being a double instrument with two scales, one of which shows the temperature while the g. H_2O per cubic meter of gas is read directly from the other. Directions for operating are given.

A NEW CARBON DIOXIDE RECORDER. Abstracted from Electrician, 1922, 89, 15, in Chem. Abstr., Oct. 20, 1922, 16, No. 20, 3415.—This article describes an electrical resistance meter depending upon the variation in thermal conductivity of the air with varying amounts of CO_2. A portable non-recording apparatus for quantitative analysis of CO_2 in air is also described.

NEW APPARATUS FOR THE DETERMINATION OF THE CARBON DIOXIDE OF THE AIR. *H. Lundegardh.* Biochem. Ztschr., 1922, 131, 109-115.—This title is listed for the benefit of interested readers.

THE KATA-THERMOMETER AS A MEASURE OF VENTILATION. *L. Hill, H. M. Vernon* and

D. Hargood-Ash. Abstracted as follows from Proc. Roy. Soc., 1922, 93B, 198-206, in Chem. Abstr., Sept. 20, 1922, 16, No. 18, 3151-3152. —A study of the use of the dry kata-thermometer to measure wind velocity and temperature, and of the wet kata-thermometer to measure wind velocity, temperature, and evaporation.

INDUSTRIAL MEDICAL SERVICE: MEDICAL DISPENSARIES AND HOSPITALS IN INDUSTRIAL PLANTS

The Works Doctor in France. Lancet, Dec. 23, 1922, 203, No. 5182, 1344-1345.—This notice reviews an article by Prof. Etienne Martin in the *Journal de Médecine de Lyon*, in which is told how the French Ministry of Labor during the war took steps to install industrial physicians in most munition factories. The workers are now anxious to retain these medical services, and employers in large industries are looking upon the works doctor as a necessity, although not a legal obligation.

A summary is given of the services rendered and of the way in which close cooperation is effected between doctor and employer. University faculties of medicine are urged to undertake the training of physicians to be expert in industrial hygiene.—E. L. Collis.

Improved Medical Supervision in Factories. *W. F. Dearden.* Welfare Work, 1922, 3, No. 35.—This article is written to draw attention to the possibilities of cooperation between the welfare supervisor and the certifying surgeon. The section of the Factory Act dealing with the examination of young persons for certificates of fitness is criticized. It is pointed out how arrangements may be made between the employer and certifying factory surgeon and cooperation established between the welfare supervisor and the surgeon on such matters as the "following up" of young persons, and extension of the age limit for examinations, reexamination of adolescents, and first aid.—E. M. Hewitt.

INDUSTRIAL HEALTH LEGISLATION: COURT DECISIONS: WORKMEN'S COMPENSATION AND INSURANCE

The Functions of the State in Enforcing Industrial Hygiene Legislation. *Francis D. Patterson.* U. S. Pub. Health Ser., Pub. Health Rep., Oct. 20, 1922, 37, No. 42, 2625-2630.—The logical, effective plan of Pennsylvania in making industrial regulations is first to call into consultation both employer and employee.

Industrial legislation should include provisions for: (1) care of the pregnant wage earner; (2) effective prevention of child labor; (3) seats for female employees; (4) hours of labor for female employees; (5) washing facilities at work places; (6) eating facilities; (7) plant cleanliness; (8) safe drinking water with exclusion of the common drinking cup; (9) ventilation and heating; and (10) prevention of vocational diseases. —B. Cohen.

Term "Injury" in Ohio Workmen's Compensation Law Construed. U. S. Pub. Health Ser., Pub. Health Rep., Oct. 20, 1922, 37, No. 42, 2646.—The supreme court of Ohio has decided that the term "injury" in the Workmen's Compensation Law does not include diseases contracted in the course of employment, and accordingly holds that death from typhoid fever is not compensable. The question of the compensability of occupational diseases was not involved in the case.—B. Cohen.

Majority Report of the Committee on Estimating Compensation for Eye Injuries. Jour. Am. Med. Assn., Nov. 25, 1922, 79, No. 22, 1843-1845.—This report deals with the computation of compensation for loss in visual efficiency resulting from eye injuries. It contains tables and illustrative cases indicating the method recommended of computing compensation.—K. R. Drinker.

ABSTRACT OF THE LITERATURE
OF
INDUSTRIAL HYGIENE

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GENERAL

PHYSICAL DEFECTS DISCOVERED IN SELECTIVE DRAFTS MEN DURING THE WORLD WAR. *Merritte W. Ireland.* Jour. Am. Med. Assn., Nov. 4, 1922, 79, No. 19, 1579-1581.—The more important physical causes of rejection of drafted men during the World War were: organic diseases of the heart, 11.5 per cent. of the total causes of rejections; tuberculosis, 9.3 per cent.; errors of refraction, 8.4 per cent.; underweight, 7.6 per cent.; mental deficiency, 4.5 per cent.; hernia, 4.3 per cent.; flatfoot, 3.6 per cent.; defective and deficient teeth, 3.2 per cent.; defective speech and hearing, 2.6 per cent.

Of the large class of diseases, the defects of the bones and organs of locomotion ranked first, with 17.2 per cent. of the total causes of rejections; diseases of the heart and blood vessels, second, 15 per cent.; diseases of the eye, third, 12.6 per cent.; and tuberculosis, fourth, 9.3 per cent.

Of the individual defects which were recorded most frequently in the men examined, the principal ones occurred in this order: flatfoot, 11.7 per cent.; venereal disease, 5.7 per cent.; hernia, 4 per cent.; refractive errors of the eye, 3.3 per cent.; organic disease of the heart, 3.1 per cent.; underweight, 3.1 per cent.; tuberculosis, 2.5 per cent.; hypertrophied tonsils, 2.3 per cent.; defective teeth, 1.4 per cent.; mental deficiencies, 1.2 per cent.—K. R. Drinker.

HEALTH HAZARDS IN INDUSTRY. *D. G. Robertson.* Ministry of Health, Commonwealth of Australia, Service Pub. No. 22, 1922.—This pamphlet usefully indicates the health hazards in industry, the occupations in which

they occur, and the signs and symptoms of ill health to which they give rise. It presents a readable digest of recent works on industrial hygiene. Attention is drawn to environmental influences, such as air stagnation, temperature and humidity, dust and fumes; the importance of infection from worker to worker; inadequate illumination; overfatigue; abnormal attitudes and over-exercise of certain parts of the body.

The relation of industry to the spread of anthrax, hookworm, septic infections, and tuberculosis is pointed out; and modern views with regard to the occurrence and prevention of accidents are stated. The publication closes with a valuable and comprehensive table in which are summarized (1) each particular hazard, (2) the symptoms or condition of disease to look for, and (3) the occupations which offer the hazard. This document is important not only for itself but as being a landmark indicating how rapidly the science of industrial hygiene is spreading throughout the world.—E. L. Collis.

Some Factors Which Make for Efficiency and for the Social Uplifting of Industry. *Thomas Oliver.* Brit. Med. Jour., Aug. 26, 1922, 2, No. 3217, 374-377.—The fact that workers are physically affected by the trade which they follow raises the question as to whether they should periodically undergo medical examination. Dr. Oliver mentioned three points of view from which the subject could be approached: (1) the attitude of the workman concerning his rights, to which he would probably subordinate all questions concerning his health and his industrial future; (2) the attitude of the employer; and (3) the general medical aspect of the question. It was his opinion that the working men themselves would not accept medical examination on the lines which had hitherto been proposed, and that it would be difficult to make an examination compulsory, though in any particular factory it might be tried voluntarily as an experiment. Employers also might raise objections on the score of expense and temporary suspension or dislocation of work, though probably few would object to an entrance medical examination of apprentices, or to periodic repetition of examinations during the years of apprenticeship, since physical or other defects might be detected, and the youth given an opportunity of taking up another occupation. There would be advantages to the youths themselves if, after completing their apprenticeship and having attained the age of 18 or 19, they were medically examined and pronounced fit to remain in the employment. The physical breakdown in health of many young persons during the past years might have been due to the lack of repetition of the medical examination. In the case of the older employees, the examination might also show whether the individual was fit for the particular work, and whether the occupation was suiting him, for men and women cannot go on working for several years in succession without some structural changes occurring in the body, as indicated by a rise of blood pressure, or by impairment of the action of the heart—changes which dietetic and medicinal treatment accompanied by a respite from work might possibly correct.

In the face of such facts Dr. Oliver thought that there could be no serious objection to a medical examination of men who were taking up factory work for the first time, and to a record being kept of the results of such an examination. Though some sections of the labor party might not approve of this, there are certain trades in which a pre-occupation examination is already required. While admitting that, so far as taking on "datal" labor at the factory gate was concerned, an experienced foreman was a better judge of an applicant's special fitness for the particular kind of work than a doctor could be, Dr. Oliver considered that a careful medical examiner could be of assistance in occasionally detecting beneath the strong frame and the healthy appearance of the workman the existence of some serious disease. It may be objected that the medical examination, by preventing men from taking up certain trades, will increase the number of unemployed; but opposed to this is the fact that only the fittest men will be recommended to take up the harder trades and the less physically fit sent to those which are less arduous. Is it likely that labor will consent to such an assignment and distribution of applicants for work? Men are neither machines nor draft animals, nor is there the slightest reason why physical

fitness should be thus penalized. Quite apart from physical fitness the personality of the worker must be considered, and it must be remembered that his health is his capital.

Respecting the suggested reexamination of all young persons employed in factories at an age of 18 or 19 years, Dr. Oliver instanced the large number of deaths of female workers between the ages of 18 and 25. During the early years of employment in a factory young persons ought to be medically examined, since this is a vulnerable period, particularly of female life, as shown by the tables of the Metropolitan Life Insurance Company of America. During the last decade, an increase occurred in the number of deaths of girls between 15 and 20 years of age, while other age-periods showed a decrease; also there was an increase in the tuberculosis death rate amounting to 5 per cent. in adolescent girls, while the mortality rate from the same cause in boys of the same age decreased 25 per cent. He suggested that, if a medical examination of the workers were ever established in Great Britain, the health risks might be brought within the range of life insurance, and he instanced certain American experiences which supported such a scheme. He said that many persons believed to be quite healthy were found to have physical defects or diseases capable of cure or of being benefited. In women, for example, cancer in its early stages had been detected and removed, with the result that many of the women were alive today. One of the greatest stimuli to industrial efficiency was work; on the other hand, as causes of industrial inefficiency we could not overlook individual slackness, prolonged unemployment, and frequent strikes.—W. F. Dearden.

SYSTEMIC OCCUPATIONAL DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

Cancer of the Scrotum: The Etiology, Clinical Features, and Treatment of the Disease. *A. H. Southam* and *S. R. Wilson.* Brit. Med. Jour., Nov. 18, 1922, 2, No. 3229, 971-973.—A strong doubt as to whether, under modern industrial conditions, the majority of cases of epithelioma of the scrotum are actually chimney sweep's cancer induced these two surgeons to study the records of the patients treated in the Manchester Royal Infirmary during the past twenty years (1902-1922).

The occupational incidence was shown to be as follows:

Mule spinners	69
Tar and paraffin workers	22
Sweeps	1
Various occupations	38
Occupations not stated	11
Total	141

These figures show that in South Lancashire the incidence of the disease is very pointedly associated with two important groups, the one most affected being workers engaged in the staple industry of cotton spinning; and further, that the local chimney sweeps must have taken seriously to habits of cleanliness.

The article contains nothing new respecting the incidence of cancer among tar and paraffin workers, but is of deep interest when it comes to deal with "mule" spinners. The fact that in a large proportion of the cases from cotton mills the growth was situated on the left anterior aspect of the scrotum, led the authors to investigate the exact significance of this feature. They find that the "minder" in "piecing up" does this with his left hand, at the same time standing on his left leg with his right stretched out behind to counterbalance his reach over the mule carriage. On the carriage itself, about 3 feet from the floor, is a steel bar running the whole length, and this they found to be in a greasy state from the oil thrown off by the revolving spindles. The method of stance described has the effect of bringing the left groin and scrotum against the greasy bar every time the operation of piecing is carried out. The spinner works in a shirt and a pair of linen trousers, which are washed at the week-end; an inspection at this time shows a well-marked oil zone, 6 to 8 inches in depth, across the garment at a level corresponding to the upper part of the thighs and lower abdomen. The skin in this region is, therefore, constantly irritated by the oil, and itching and scratch-

ing result. The oil in general use is said to be a mineral oil of the paraffin series. An additional factor emphasized is that the spinner works in a hot and humid atmosphere and perspires freely. The authors ascribe the causation of irritation to friction of clothing, repeated traumatism of the body against the machine, and the continuous contact with mineral oil.

The lesion commences almost invariably with a solitary wart; this is on the left front in 83 per cent. of the cases, on the right front in 10 per cent., and on the mid line in 6 per cent. It would appear that this wart is cancerous from the beginning, as local removal is frequently followed, about twelve or eighteen months later, by malignant deposits in the groin. The warty stage persists for four to six months, the tumor varying in size from that of a sixpence to that of a half crown; after this period the typical ulceration commences. The rate of growth varies, but the average time from onset to coming into hospital was twelve months. Local spread is not rapid or extensive; in only six cases was the testicle involved, and in only three was the penis affected. Secondary infection of the inguinal glands is common, but in only one case did the growth spread to the peritoneum. Treatment consists in early removal of the growth, together with the lymphatic glands of both groins.—W. F. Dearden.

Experimental Tar Cancer. *H. T. Deelman.* Abstracted as follows from Nederl. Tijdschr. v. Geneesk., July 22, 1922, 2, No. 4, 334, in Jour. Am. Med. Assn., Nov. 4, 1922, 79, No. 19, 1649-1650.—Among the points emphasized by Deelman from his research on mice is that it takes a certain standard length of time for the benign proliferation of epithelium to occur in consequence of repeated application of tar. It develops cancer in time, but the interval before the cancer becomes manifest varies within a wide range. This suggests, he says, that the precancerous condition develops according to a regular process, but the development of cancer therefrom is dependent on more or less casual circumstances. The cancer seems further to have a multicellular beginning.

Tar Cancer in Mice (Le Cancer du Goudron chez la Souris). *G. Roussy, R. Leroux* and *E. Peyre.* Presse méd., Dec. 9, 1922, 1061-1065.—A summary is presented of research in which over 500 white mice were anointed with tar. Epitheliomata were produced similar to those described by Fibiger, Bang, Murray, and Leitch. The authors state that secondary growths were rare, and showed a predisposition to be localized in the lungs, which is unusual; they were unable to graft the epitheliomata produced on other mice. In one case the character of the growth was epitheliomatous on the surface, but sarcomatous deeper down. Attention is directed to one series of mice: 30 per cent. developed malignant tumors; 30 per cent. developed benign tumors; 10 per cent. developed tumors which appeared, but then regressed and disappeared; while 10 per cent. were completely refractory. Yet the mice were all of the same breeding, of the same age, often of the same litter, were living in the same cage, and were treated in the same way. These results point to the living soil (*facteur terrain*) playing an important part not yet understood. Attempts to modify the soil by food lacking in vitamines gave no definite results.—E. L. Collis.

The Effect of Cessation of the Irritant on the Development of Experimental Tar Cancer. *Archibald Leitch.* Brit. Med. Jour., Dec. 9, 1922, 2, No. 3232, 1101-1103.—This article by the director of the Cancer Hospital Research Institute (London), details certain experiments upon mice, which were made with a view of determining the effect on the development of cancer of the complete cessation of tar applications before signs of malignancy had developed. Clinical observations in human cases have shown that with removal of the irritant some warts disappear, some remain simple for many years, and presumably continue so indefinitely, and some warts progress to malignancy.

Discarding from consideration the case of one mouse which died and was eaten by its companions, the first series of investigations relates to fourteen mice, which, after from four to five months' local treatment with tar, exhibited small warts on the skin, all of which were definitely considered to be simple growths at this particular stage. The subsequent history shows that the papillomata dis-

appeared in five cases, remained as simple growths in three cases, and became malignant in six cases. The author makes these deductions: (1) that the production of the cancerous state is not necessarily the result of the action of the irritant on neoplastic as contrasted with pre-neoplastic tissues; (2) that the bias toward malignancy is given to the cells probably during the pre-neoplastic stage; and (3) that the successful transplantation of a tumor in the histologically doubtful stage is not a sure proof of malignancy of the tissue at that particular date, since the tumor, if left alone in its natural environment, will tend to declare itself as an epithelioma.

With a view to rendering these conclusions more certain a further series of experiments was undertaken; the essential condition being that in all the cases the irritant had been suspended before any neoplastic action had taken place. The mice were painted three times weekly for four or five months, and when this was stopped there were twenty mice with no visible sign of neoplastic reaction. Of these, six remained negative until they died, four developed temporary warts, four developed simple papillomata, and six developed malignant tumors.

These experiments clearly show that when tar has been applied repeatedly for a certain length of time, and the irritant is then removed, tumors, even carcinomata, may make their appearance at a later date. Undoubtedly the irritation produces in the normal cells subjected to its influence some profound change, undetectable by the microscope, so that they eventually proliferate in an unrestrained and harmful fashion. The author concludes that the neoplastic response to an irritant is a slow tissue reaction that exhibits no defensive property, that subserves no useful function. The internal changes in the cells in the earliest stages may some day be analyzed: at present they are quite unknown. In the skin epithelium we have a tissue which we have been taught to believe is constantly being shed and constantly regenerated, and one would imagine that the damaged cells would soon be shed, leaving a new and healthy race to take their place. Of course in man the processes take a much longer time to evolve.

We can discover the minimum duration of exposure to a tissue irritant necessary to produce cancers in mice, and thus form an idea of the length of the latent period before they are evident; it is possible that this will vary with different agents.—W. F. Dearden.

The Production of Cancer by Specific Forms of Irritation. *J. A. Murray.* Brit. Med. Jour., Dec. 9, 1922, 2, No. 3232, 1103-1104.—Discussing the artificial production of tar cancer in mice, the author refers to the opinion of Bloch and Dreyfuss that the active substance is contained in the anthracene fraction of coal-tar boiling at over 300°C. In his own experiments he finds that an extremely active extract can be prepared from tar by successive extractions with water, alcohol, and ether; the last is particularly effective. He applied unaltered tar, alcoholic extract, and ethereal extract to separate areas of the dorsal skin of each of sixty mice. After four months, when the first tumor appeared, fifty mice survived, and of these twenty-five presented new growths. Twenty-two of the latter bore carcinomata at the sites painted with ethereal extract, twelve at the sites treated with the original tar, and two only at the sites treated with the alcoholic extract.

Another series of experiments with tar was carried out on mice which had previously responded to tar applications in other situations. Up to the time of this report, no second initiation of cancer had been observed. Mice which had developed spontaneous mammary carcinoma had been similarly treated without success. These latter experiments seem to indicate that the previous existence of a cancerous growth may in some way hinder the production of a second primary tumor.—W. F. Dearden.

Paraffin Cancer and its Experimental Production. *Archibald Leitch.* Brit. Med. Jour., Dec. 9, 1922, 2, No. 3232, 1104-1106.—The author first summarizes certain interesting facts brought out by a study of historical cases occurring in the Scottish shale oil industry and in connection with German brown coal distillation. The subjects of his study have been long exposed to the action on the skin of crude mineral oils, and though the lesions are referred to as "paraffin cancers," it is by no means certain that the particular

harmful agent in the oils is a member of the paraffin series; both shale and German brown coal yield, in addition, a varied range of chemical derivatives. The workers in the refineries who deal with solid paraffin or with the more refined oils are not prone to dermatitis or cutaneous tumors. Whatever the chemistry of the substances may be, there is in crude paraffin oils something that induces neoplasia. The skin cancers that they produce are all of an exactly similar type; they occur on sites unusual for squamous carcinomata unassociated with definite forms of irritation; they are frequently multiple; they are generally preceded or accompanied by warts or other hyperplasias; they are often of a low degree of malignancy; it takes several years of exposure to the noxious substances before they develop—never less than ten years in the German industry and probably never less than fifteen in the Scottish oil works. Although the patients are usually of middle age or over, it is a question perhaps rather of the length of exposure than of the age of the individual. Can it be said that the substances under consideration are the actual cause of epitheliomata? The generally accepted opinion has been to regard them as mediate or predisposing rather than as proximate causes; they bring about such a pathological condition of the skin that the soil is rendered suitable for the operation of some other and hitherto mysterious cause. Though it is impossible to controvert such an idea, the author thinks that the success which has attended his efforts to produce cancer experimentally minimizes its cogency.

For the purpose of his experiments he obtained from a Scottish oil company supplies of four crude products known severally as "green oil," "blue oil," "unfinished gas oil," and "unfinished lubricating oil"—a series advancing in purity and representing in the order given a diminishing content of solid paraffin. Mice were used and painted between the shoulders three times a week for several months.

Green Oil.—This product is the first with which workmen come in contact. A series of 100 mice was used and after one hundred days only twenty-nine remained alive. Of the survivors sixteen never developed tumors, four exhibited small warts which subsequently disappeared, eight developed simple increasing papillomata, and one developed a malignant tumor. The mouse last mentioned showed advanced papilloma of doubtful character on the surface and a deeper growth which proved to be a spindle celled sarcoma.

Blue Oil.—Workmen at the presses are continually in contact with this oil. At the end of one hundred days twenty-two mice out of 100 used were alive, and of this number nine remained negative, one showed a temporary tumor, ten had increasing papillomata, and two developed malignant tumors. Of the latter, one mouse showed two distinct epitheliomatous growths and the other a spindle celled sarcoma infiltrating the deep muscles.

Unfinished Gas Oil.—Only one temporary tumor was obtained among thirteen mice which had survived the one hundred days.

Unfinished Lubricating Oil.—Three tumors were produced among ten mice which survived the one hundred days, one developing into a typical epithelioma.

The article gives details respecting the thirty mice which survived and reacted. Owing to the increase in death rate after the one hundred days, it was impossible to say how many would have developed tumors had they lived long enough, or how many of the simple growths would have become malignant. Certainly one animal resisted for over nine months. In many of the other papillomata Leitch experienced some difficulty in forming a judgment of their benignity or malignancy; the boundary line being nebulous, he adopted the convention of not reckoning a tumor as malignant, no matter how extensive the heterotopy of epithelium or the lack of differentiation of the cells unless the panniculus carnosus had been definitely penetrated. He did not use the method of transplantation as a criterion of malignancy because he did not believe that it gave any surer, or even additional, information on that point. The sections of the two sarcomata had been seen by several pathologists of distinction all of whom agreed with the diagnosis. Leitch expresses the opinion that the sarcomatous development, which in these two cases occurred underneath previously existing papillomata, was probably due to the entrance of the carcinogenic agent into the subcutaneous connective tissue through small fissures in the over-

lying epithelium. Sarcomatous formation has not been found in paraffin workers, but its observation in mice is of interest in that it demonstrates that the same causal agent may produce two such widely different kinds of malignant tumors as epithelioma and sarcoma. Leitch believes that the results of the experiments show that an actual causal agent, in contradistinction to a predisposing agent, was dealt with.—W. F. Dearden.

EPITHELIOMATOUS ULCERATION IN INDUSTRY. *T. M. Legge.* Brit. Med. Jour., Dec. 9, 1922, 2, No. 3232, 1110-1111.—The author explains the measures taken by the British Government to prevent the incidence of irritative cancer industrially and to secure prompt treatment when it does arise. When pitch cancer was scheduled as an industrial disease qualifying for compensation in 1907, its definition was widened to include causation by paraffin and mineral oil. After an inquiry in 1911, regulations were issued governing the manufacture of patent fuel with the addition of pitch other than blast furnace pitch. Blast furnace pitch had been excluded, as no evidence of the production of cancer from its use could be found and it was shown to be of different chemical composition from gas works pitch, containing neither naphthalene nor anthracene.

From 1911 to 1919 there was voluntary notification of cases of pitch warts and of cancers requiring treatment, and these were reported upon by certifying surgeons. Information was thus received of 158 attacks, with three deaths, among pitch workers; twelve, with two deaths, among tar workers; and twelve among workers in the shale oil industry.

In January, 1920, epitheliomatous ulceration occurring industrially was, by order of the Secretary of State, added to the list of notifiable occupational diseases and poisonings. Preceding June 30 of the current year, ninety-five attacks had been notified and investigated, sixty-six being among pitch workers, twenty-one among tar workers, and eight among paraffin workers. The actual number affected was eighty-nine, there being single recurrence in four cases and double recurrence in one case. Fifty-eight of the sufferers were between 40 and 60 years of age; twenty-seven had worked from twenty to thirty years, and seventeen between thirty and forty years at their employment; the scrotum, face, forearms and hands were the main sites of the disease. A table is given stating the specific occupations of those affected. The total number engaged in the patent fuel industry is given at 2,500, but the number in the tar-distilling industry is not yet known. The number engaged in paraffin refineries of shale oil works is 200, but the number of retort men is not available.

In 1919 the trade unions in South Wales asked for voluntary medical examinations in order to prevent pitch warts from becoming inoperable; this was arranged for those over 30 years of age, who had been employed over ten years (this included about 20 per cent. of the workers). It is now possible for any workman to consult Dr. Scholberg, the pathologist of the Cardiff Royal Infirmary, or Dr. Sladden of the Swansea Infirmary.

No case of aniline tumors of the bladder had been reported. Although since January, 1920, 175 cases of chrome ulceration had been notified, in none of these was there any suggestion of epithelioma.—W. F. Dearden.

RESPIRATORY SYSTEM

ACUTE SUFFOCATIVE EDEMA OF LUNGS. *W. J. Tyson.* Abstracted as follows from Lancet, Oct. 21, 1922, 203, No. 5173, 859, in Jour. Am. Med. Assn., Nov. 25, 1922, 79, No. 22, 1882.—Tyson asserts that these are really cases of aborted pneumonia, in which the congestive stage is fully developed and then the disease stops, being relieved by the escape of the collected serum, to end either in rapid recovery or in rapid death. The consolidation of the lung is not often demonstrated, but the signs of acute congestion are present. In his case, which is cited, only one lung was attacked, and herpes on the lips was present, both symptoms suggesting a pneumonic origin. Influenza seems to favor this condition, being the starting point of the pneumonia in two or three cases recorded—in Tyson's case an influenza epidemic was present in the district where the patient lived. Immediate venesection is the treatment generally recommended, together with outward applications, such as wet cupping and mustard plasters. Morphin, iodids, or blisters should not be used in the treatment of these cases, for obvious reasons.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

CARBON MONOXID POISONING. *M. Nicloux.* Abstracted as follows from Méd., Sept., 1922, 3, No. 12, 913, in Jour. Am. Med. Assn., Nov. 11, 1922, 79, No. 20, 1722.—Nicloux reiterates that the blood corpuscle is not injured irreparably by carbon monoxide displacing the oxygen in the hemoglobin, provided oxygen can be supplied promptly to drive out the carbon monoxide in turn. The corpuscle asks nothing better than to resume its normal functioning with oxygen.

DANGERS OF PHOSPHORIC AND HYDROCYANIC ACID VAPORS. Jour. Am. Med. Assn., Nov. 25, 1922, 79, No. 22, 1863.—Dr. Schnellen, medical adviser in a large match factory, made experiments on animals with the vapors of phosphoric acid and hydrocyanic acid, with findings in perfect accord with those of Wayschall, Yanote and Lehmann. Hydrocyanic acid, when given in the strength of from 0.03 to 0.04 per cent., has no effect on cats after three or four hours' exposure. As soon as the strength of the vapor is raised to 0.05, and the animal is immersed in it for an hour and a half, grave symptoms appear, such as deep respiration, increased salivation, dilatation of the pupils, cramp and vomiting. If the animal is kept in this atmosphere for from two and a half to five hours, death ensues. If the strength of the vapor is raised to 0.12 or 0.15 per cent., death occurs within thirty minutes, accompanied by the foregoing symptoms. In calculating the amount of hydrocyanic acid necessary to destroy life, the dose is found to vary from 1 mg. of the acid to 5 mg. for each kilogram of body-weight of the animal. For man, it is calculated that 60 mg., or from 0.8 to 1 mg. for each kilogram of the body-weight, would be a minimal lethal dose.

For phosphoric acid, it is found that doses of from 0.6 to 0.4 per cent. for a quarter of an hour render the animal quiet (Lehmann's experiments). After twenty minutes' immersion, the saliva is emitted from the mouth, with vomiting, and feebleness and unsteady movements are noted. An immersion lasting half an hour causes death. If the animal is allowed to remain fifteen minutes in the saturated receptacle, it requires two days in the open air to recover.

THE TOXICITY OF TETRACHLORETHANE. *Frois.* Rev. d'hyg., Nov., 1922, 44, No. 11, 987-992.—The author comments briefly upon the value of the following substances as industrial solvents: carbon tetrachloride, dichlorethylene, trichlorethylene, tetrachlorethylene, tetrachlorethane, and pentachlorethane. Because of their noncombustible character they may be used to advantage in the place of benzine and carbon disulphide.

He states that carbon tetrachloride in a concentration of 1.5 gm. per hundred liters of air induces narcosis, headaches, and vomiting. It attacks copper and zinc in a humid atmosphere.

Tetrachlorethane is the best solvent for cellulose acetate and it has extensive uses in the manufacture of varnishes and colors and of lacquer; in the rubber industry; in the extraction of certain alkaloids and of oils; and in lithography and numerous other processes. He recalls the cases of poisoning from tetrachlorethane which occurred during the war in connection with the use of the chemical in the varnish for aeroplane wings, but reports that no fatalities resulted in France. One death occurred in the case of a girl employed in the manufacture of gas masks, using as cement a solution of cellulose acetate dissolved in tetrachlorethane mixed with alcohol denatured with acetone.

Three deaths more recently occurred among workmen engaged in the manufacture of artificial pearls, which in some establishments are coated with a solution of fish scales in tetrachlorethane. Though the exact cause of the fatalities was not legally determined, the reports of severe jaundice led the author to believe that they were produced by tetrachlorethane, especially that evaporated from the pearls in the course of drying.

He mentions as the initial symptoms of poisoning headache, dizziness, and vomiting. There is variation in susceptibility, but workers affected even slightly seem as a rule to have severe attacks if they are again exposed to the toxic agent. The vapors affect the nerve centers and the liver. There are no changes in the blood such as those observed in cases of jaundice produced by nitro derivatives of benzene and toluene.

In the author's opinion general measures to promote good ventilation of the workroom are insufficient and tetrachlorethane fumes should be removed by exhaust near the points at which they are liberated. He suggests the use of a cage with glass top and front, with holes for the arms of the worker. Downward exhaust, maintained at low pressure would remove the fumes without causing too rapid evaporation of the solvent with consequent chilling of the hands of the operator and injury to the pearls.—Wade Wright.

METHANE IN STEEL CYLINDERS. *J. Bronn.* Zentralbl. f. Gewerbehyg., June, 1922, 10, No. 6, 158-159.—Dr. Bronn discusses a new process for compressing methane into steel cylinders under 150 atmospheres, which permits transportation for industrial uses. On account of slow combustion in gas burners, the flame tends to go out, but, if protected, high temperatures can be reached. Methane oxygen flame is used in welding copper, brass, and aluminum; methane is also used for making methyl chloride, methyl alcohol, and formaldehyde. It is produced commercially by coking of coal.

Lehmann considers it only slightly toxic. Air and methane mixtures, especially with 9 to 10 per cent. of methane, are explosive. In the presence of dust, a mixture of 3 per cent. methane in air is explosive.—J. W. S. Brady.

LEAD POISONING. Jour. Am. Med. Assn., Nov. 25, 1922, 79, No. 22, 1861-1862.—At a recent meeting of the Academy of Medicine, Herman touched upon the problem of the use of white lead. He regards air-borne lead poisoning as probable. These conclusions are based upon (1) the presence of lead in a disk of filter paper placed in a drier above a layer of white-lead paint, and (2) the lead reaction, secured seventeen times out of twenty with slips of filter paper suspended at various heights in a room freshly painted with white lead. Herman stated that a current of air may carry extremely minute particles of lead products, even after remaining a long time in a given spot. To intercept these minute particles, it is necessary to interpose a tampon of cotton, which retains them in the felt of its fibers, where their presence can be shown by chemical analysis. A practical conclusion of the highest importance is therefore imperative: During the use of white lead paints, microscopic droplets containing lead are produced. These remain suspended in the air sufficiently long to allow them to penetrate the respiratory passages (mouth and nose) of the workmen.—K. R. Drinker.

STUDIES OF CHRONIC INTOXICATION ON ALBINO RATS. VI. LEAD CARBONATE. *T. Sollmann.* Abstracted as follows from Jour. Pharmacol. and Exper. Therap., 1922, 19, 375, in Med. Science, Nov., 1922, 7, No. 2, 168-169.—The author gives a short summary of what is known with regard to lead poisoning in man and in animals. The amount necessary to produce intoxication in man is from 0.2 to 0.3 mg. per kilo. The amount is much higher for animals. The experimental work was done on rats. Amounts from 0.0007 to 0.15 mg. per kilo produced slight but definite check of growth and appetite. The mortality of these rats was high between nine and seventeen weeks, owing probably to lowered resistance. The whole dose of lead in clinical human plumbism probably begins with one-fifth to one-third grain per kilo; but it is seen that much smaller doses are not harmless to rats, and it is pointed out that in cases of metallic poisoning there is probably a wide gap between the amounts which will produce definitely poisonous symptoms and those which are completely harmless.

URINARY PORPHYRIN IN LEAD POISONING. *O. Schumm.* Abstracted as follows from Ztschr. f. physiol. Chem., 1922, 119, 139, in Med. Science, Nov., 1922, 7, No. 2, 168.—The spectroscopic and physical properties of the porphyrin excreted in the urine in cases of lead poisoning show that it has the characteristics of fecal porphyrin and not of true urinary porphyrin, the latter not being present in detectable amounts. If this be the case it follows that the porphyrinuria of lead poisoning is not identical with that due to veronal.

THE RISKS OF PLUMBISM IN POTTERY AND CHINA MANUFACTURE IN SWEDEN. Abstracted from Kungl. Socialstyrelsen, Stockholm, 1922, pp. 28, in Internat. Labour Rev., Sept., 1922, 6, No. 3, 455-456.—This is the report of an

investigation of lead poisoning in the pottery and china trades in Sweden. During the last few years conditions have improved because of the substitution of insoluble silicate of lead for lead oxide in the glaze used in manufacture. Out of seventy-one persons examined only one definite case of poisoning was proved, another had definite chronic symptoms, and 42 per cent. of those examined had slight symptoms which were possibly referable to lead. Thirty-three per cent. had basophilic granules in the blood in a proportion of over 300 to the million.—J. C. Aub.

The Method of Blood Examination in Lead Poisoning. *G. Seiffert.* München. med. Wchnschr., Nov. 17, 1922, 69, No. 46, 1595-1596.—This is a reply to the criticism of Engel upon the author's method of staining for stippling in unfixed blood smears. Seiffert maintains that blood smears which are dried in air and then stained with methylene blue, without first fixing in alcohol, make the search for stippling easier than in fixed smears. The number of stippled cells is larger. The only difficulty comes in distinguishing reticulated cells which have fainter granules not uniformly distributed through the cell.

A few stippled cells may be found in bloods of persons not exposed to lead.—J. C. Aub.

Saturnine Asthma: Is There Such a Malady? *Thomas Oliver.* Lancet, Oct. 28, 1922, 203, No. 5174, 907-909.—The question as to whether there is such a malady as saturnine asthma is discussed. A case of asthma is quoted wherein the patient had been in the habit of using occasionally a hair-wash which contained lead in considerable quantity. A trace of lead was also found in the urine, and the blood contained a few punctate basophilia. The asthmatic attacks improved whenever the use of the hair-wash was discontinued. The patient, as might be expected, showed a marked intolerance for iodide of potassium. The patient also suffered from phthisis, from which he finally died. After discussing the literature of recorded cases and pointing out that saturnine asthma in a lead worker is extremely rare, the author states that the relation of plumbism and asthma is not clear.—E. L. Collis.

DUST HAZARDS AND THEIR EFFECTS

The Efficiency of the Palmer Apparatus for Explosive Carbonaceous Dusts. *L. J. Trostel.* Jour. Am. Soc. Heating and Ventil. Eng., Dec., 1922, 28, No. 9, 853-858.—The Palmer apparatus was tested against elevator dust, corn starch, wheat flour, smut spores, ground oat hulls, ground sulphur, sugar, cocoa, ground rubber, and wood flour. All of the above dusts showed particles of sizes ranging from 5 to 150 microns. All were dried to constant weight and only the portions passing through a hundred mesh screen were used. Samples were introduced into the Palmer apparatus by rapping a tube, the end of which was covered with a bolting cloth to serve as a screen, as it was found impossible to float uniform dust clouds of particles of this size by air currents. The average efficiency of the Palmer apparatus for all of the above dusts was found to be 98.2 per cent. at speeds of 3 to 5 cubic feet per minute. The author's results indicate that the efficiency of the apparatus increases slightly with the size of the samples.—Philip Drinker.

Silicosis and Miners' Phthisis. *W. E. Gye* and *E. H. Kettle.* Brit. Jour. Exper. Pathol., Oct., 1922, 3, No. 5, 241.—Insoluble silica and silica sol, injected subcutaneously, cause a similar and characteristic lesion consisting of a central area of necrosis surrounded by a zone of leucocytes; around this again is a second annular zone of necrosis limited by macrophages and granulation tissue. Tubercle bacilli proliferate rapidly in the necrotic areas, a small dose of bacilli becoming a large dose. In this way silica aids in establishing a local infection.

1. The Anti-Bactericidal Properties of Colloidal Silica. 2. Agglutination of Washed Red Blood-Corpuscles by Colloidal Silica. *S. L. Cummins.* Brit. Jour. Exper. Path., Oct., 1922, 3, No. 5, 237-240; 260-262. — 1. The relation of cause and effect existing between the inhalation of silica dust and the occurrence of pulmonary silicosis in certain industries gives interest to research which discloses

the biochemical properties of silica. Blood serum is able to destroy typhoid bacilli, but the addition of colloidal silica was found to preserve the bacteria from the action of the blood. Similarly hemolysis of sensitized red blood cells was inhibited by colloidal silica. Cummins concludes that: (1) Colloidal silica has the property of interfering with the bactericidal power of blood in marked degree. (2) It inhibits the action of "complement" in a hemolytic mixture. This anti-complementary property is probably the character to which it owes its antibactericidal power. (3) These properties, together with the lack of any demonstrable germicidal power, point to colloidal silica as likely to be of great use in blood cultures in cases of bacteriemia.

2. Colloidal silica solution to which sufficient salt has been added to bring the mixture up to 0.75 per cent. of salt brings about rapid agglutination of washed red blood corpuscles and this result can still be obtained after considerable dilution.

The flocculation and sedimentation of washed red cells by colloidal silica is to a great extent prevented by the presence of concentrated human serum, this inhibition disappearing as the serum is made more dilute. The inhibition seems to depend upon the formation of a gel.—E. L. Collis.

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT AND PREVENTION

The Position of the Colony in the Tuberculosis Campaign. *S. Tinker.* Tubercle, Dec., 1922, 4, No. 3.—The author maintains that the municipal workshop offers opportunities for protected labor in a large number of cases, but that in rural areas a co-operative system of marketing the goods made by patients at home is essential. He considers that village settlement is too expensive a method of dealing with a large number of cases, but holds that industrial colony life reestablishes the mental as well as the physical well-being of patients, fostering initiative, and bringing the men out of the hopeless attitude which unemployment causes, and that although initial results may be small, they will increase with time and experience.—E. L. Collis.

Critical Reviews. Tubercle, Dec., 1922, 4, No. 3.—The first review deals with the value of industry in the treatment of tuberculosis. Papers published by E. Troy, Chicago, by H. R. M. Landis, The Phipps Institute, by P. C. Varrier-Jones, Papworth Settlement, and by A. S. McGregor, Glasgow, are brought under review, and the conclusion is drawn that suitable occupation is of great value to the tuberculous convalescent; it improves his mental outlook and reduces the cost of treatment. Nevertheless, the worst features of industrial settlements are their cost; but it is safe to prophesy that they will survive if the good which they do is worth doing.

The second review deals with the harm that some industries exert in causing tuberculous silicosis. Recent laboratory research is brought under review, and the way in which it is confirming deductions drawn from epidemiological inquiry is stressed. In particular, reference is made to the work carried out by Mavrogordato in South Africa, by Gye and Kettle, National Institute of Medical Research, and by Cummins, Welsh National School of Medicine. Each has been attacking the problem from a different point of view, but each finds that silica possesses certain definite properties not previously suspected and not manifested by other dusts investigated.

Finding and Caring for the Tuberculous Employee. *James A. Britton.* Nation's Health, Nov. 15, 1922, 4, No. 11, 676-677.—Any plan for supervising the health of a group of employees must carry with it some plan of adequate care of those found suffering from disease. Almost any plan of health conservation may be accomplished without too much risk by smaller industries as well as by large industries if they are willing to pool their health interests. Whatever plan may be adopted for the cure, prevention, or detection of tuberculosis by the industries, it should be only a part of some comprehensive health supervision scheme.—L. A. Shaw.

Helping T. B. Workers to Come Back. *James A. Britton.* Hosp. Management, Nov.,

1922, 14, No. 5, 70-71.—Intensive study of working conditions during the last ten years has brought out the fact that in most cases it is best for the man who has had tuberculosis to return to his old work rather than try to learn some supposedly less dangerous occupation. In cases that are recognized early through routine physical examinations men can often remain at work under proper supervision or resume it after a short rest period. In moderately advanced cases, 60 per cent. can be returned to work after six to eight months of care, preferably in a sanatorium. Two thirds of these will probably be able to resume their former places, while the remainder will have to be trained for less exacting work. In advanced cases, a high rate of permanent disability—that is, 80 to 90 per cent.—is to be expected. The keeping of the early cases "on the job" involves great care on the part of the physician and of the persons affected. Reeducation of the tuberculous is recommended only in exceptional cases.

A table is given showing that out of every hundred cases coming to the attention of the average industrial physician, ten are incipient, seventy-five moderate and fifteen far advanced. Figures are given showing that of the first group all but one could return to the old work after treatment; of the second group, thirty-five; and of the third, one. It is emphasized that keeping them on through proper health supervision is much better than getting them back after the disease is contracted.—G. N. Thompson.

AN EXPERIMENT IN THE EMPLOYMENT OF ARRESTED CASES OF PULMONARY TUBERCULOSIS. *H. R. M. Landis.* Am. Rev. Tuberc., June, 1922, 6, No. 4, 253-264.—The possibility of utilizing arrested cases of tuberculosis in some form of industry that would make them altogether or in part self-supporting suggested itself in 1911. During that year a night tuberculosis class was conducted at the Phipps Institute for patients who had recovered from their acute tuberculous symptoms under dispensary or class treatment, and for returned sanatorium patients.

1. This venture has shown that arrested cases of tuberculosis can be employed to advantage without detriment to their health, if properly supervised medically.

2. It is necessary to delegate to a business man the entire management of the commercial side of the problem.

3. From the economic side the experiment was a success. The deficit was small.

ANTHRAX IN THE WOOLEN INDUSTRY, AND THE DISINFECTION OF WOOL. *G. Abt.* Rev. d'hyg., 1922, 44, No. 4, 305-327; No. 5, 408-432.—This article is a discussion of the incidence of human anthrax in France, England, the United States, and certain other countries. It deals particularly with the handling of wool and with the need for disinfection of suspected raw wools.

The article is essentially a review of the report of the British Departmental Committee on Anthrax published in 1918 (1), of a memorandum published in 1921 on the disinfecting station for wool and hair established in Liverpool (2), and of certain data published in France.

Recognizing the difficulty, indeed the impossibility, of controlling human anthrax through the institution of necessarily elaborate regulations in industry, the British committee considered the proposals of suggested action in the countries of origin of infected materials, and disinfection of wool and hair. It was the belief of the committee that action in countries of origin was impracticable at the present time, certainly in Asia.

The committee was obliged to face the fact that, in spite of existing regulations concerning the personal hygiene of operatives and the safeguarding of hazardous trade processes, cases of anthrax were appearing with increasing frequency. Furthermore, a relatively small proportion of the cases developed among operatives employed at processes covered by the regulations. The subject of disinfection was then considered and a method devised by a sub-committee (the Duckering method) was recommended. A description of the various stages of this method is included. Selected varieties of wool subjected to the disinfection process were converted into fabrics with little or no evidence of important changes having taken place in the wool as a result of the treatment that it had undergone.

Dr. Abt discusses the advisability of disinfection of various wools in the countries of

their origin. He affirms the belief of the British commission that dangerous materials should be disinfected at the earliest possible stage. Until such action is possible the commission urged the establishment of a disinfecting station in England.

The author presents the experience of various European countries and of the United States, indicating that cases of industrial anthrax resulting from the handling of wool have been comparatively rare. He concludes his article with a consideration of the importance of careful study of the question of anthrax in the wool industry from an international point of view and from that of the French nation.—Wade Wright.

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OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

DISCUSSION ON OCCUPATIONAL DERMATITIS. *W. J. O'Donovan.* Brit. Med. Jour., Sept. 16, 1922, 2, No. 3220, 499-504.—In the opening paper read at the Annual Meeting of the British Medical Association, it was pointed out that the study of occupational dermatoses was particularly the province of the preventive physician. Cause and effect can usually be directly demonstrated.

When their etiology is known diseases are generally easy to comprehend, and fall into natural groups. Unfortunately the medical literature of traumatic dermatoses consists largely of the reports of a huge number of isolated, unconnected eruptions. These arise from a multitude of old or new chemicals often hidden under trade or fancy names which require interpretation by an expert chemist. Furthermore some writers report these skin diseases under occupation, industry, or process. The names and methods of these alter and change in course of time and the agent employed may be ill defined, not mentioned, unknown, and in some cases incorrectly stated.

The absence of any accepted classification in this branch of dermatology is one of its greatest drawbacks. Every teacher and student feels this to be an urgent need. Dr. Legge tentatively suggested four groups: chemical substances, like potassium bichromate, arsenious acid, and certain finished dyes; substances which soften and macerate the tissues, such as alkalies; substances which remove the natural grease from the skin, such as turpentine, petroleum, benzine, benzene and its homologues, and their nitro and amido derivatives; and processes which mechanically injure the continuity of the skin, such as brushing, scratching, and rubbing. With the exception of the first, all these groups are arranged according to their selective activity upon the skin. If possible the divisions should be based on a single principle which can be maintained throughout the series. One might add to Dr. Legge's scheme the large group of hygroscopic substances, such as strong sulphuric, hydrochloric, and phosphoric acids, potash, soda, lime, and, because of its content of magnesium chloride, common salt. Oxidizers form a compact group and include chromic acid, potassium permanganate, chlorine, nitric acid, nitrate of ammonium, etc. Many of the substances mentioned above belong in more than one category and further groups and sub-grouping will be found necessary to formulate a complete list.

O'Donovan stressed the importance of carefully watching for any cases of personal susceptibility when a new industry having a particular health hazard is being established. He finds that a largely immune body of workers can be secured by eliminating persistently, at the first onset of symptoms, every individual showing signs of intolerance. He described the case of a man who, after a week's work of staining wood with potassium bichromate, was prevented from working, because of the inflamed and ulcerated condition of his hand. The man stated that his master had dismissed twelve men in the last three

months for the same misfortune. O'Donovan remarks that this sounds ruthless but may, on occasion, be necessary. Later he mentions certain trades where complete protection against the irritant can only be assured when all hand contact is eliminated. One may perhaps venture the remark that the bichromates are often used to color woods without causing injury to workers. If these twelve men had used a different method of applying the stain, this wholesale discharge of workmen might possibly have been avoided.

The chief theme of Dr. O'Donovan's address was the description of an extensive series of cases of trade dermatoses, some of which are rare. The London Hospital is fortunately situated for the collection of such material.

Palmar keratosis is a common industrial complaint set up by the local intermittent pressure of the tool handled. A case is mentioned which occurred in a painter from grasping the handle of his scraper, and another in a woman who repaired boots, resulting from the constant friction of her hammer. In both instances the hard and thickened skin became inflamed from secondary infection, and healing was tedious. An exceptional case is recorded of a wart developing on the middle joint of the left thumb of a baker. He attributed this to the rubbing of the part, in his daily work, by a long and hot poker. When excised the growth turned out to be a squamous celled carcinoma. A cancer developed on the tongue of a boot repairer. He was in the habit of holding a supply of iron or brass rivets in the right side of his mouth, and, as he required one, moving it with his tongue to his lips.

Contrary to his expectations, the author finds that even very dirty work does not particularly predispose toward dermatoses. Prolonged contact with water, on the other hand, is always a real hazard. Numerous cases are cited in fishmongers, cleaners of enamel advertisements, washers of jam pots, scrubbers, etc. Dermatites occurring in dry cleaners and girls who paint golf balls are described and illustrated. Here the injurious agents are naphtha, benzine, or other substitutes of a like nature.

Eight men engaged in "shovelling up" dried figs, to be made into jam, are reported as suffering from the irritation caused by the carpoglyphus passularum. This parasite was found on the dry fruit. O'Donovan thinks that this is the first recorded instance of this organism producing an occupational rash. He has seen only one example each of bakers' and sugar workers' itch, a fact which is interesting and important because the former seems to be somewhat prevalent in this country. Paper which is sent abroad is almost invariably treated with a solution of formalin in water and glycerine. A number of girls conducting this operation showed an extraordinary sensitiveness of the skin to this agent; the resulting lesions were difficult to heal.

Oil rashes and folliculitis receive much attention in O'Donovan's remarks. He thinks that when boils and onychias are rife and troublesome to cure, the occupational risk of exposure to oil should always receive close consideration. Like all who are familiar with these common dermatoses, he regards adequate washing arrangements essential for their prevention. Tinea circinata may occasionally be communicated from hides when they are being unloaded from a ship. In the particular instance mentioned, the ringed, reddish eruption at the base of the left thumb was mistaken for anthrax. In another case the fungus was found in a barber engaged in the active practice of his art. He was known to have been suffering from ringworm many years.

The lesions which result from the prolonged handling of tar pitch, etc., were fully considered. Dr. O'Donovan has seen tar cancer develop in workers engaged in pickling telegraph poles, tar distilling, pickling sleepers in creosote, and gas works stoking, and also in an anthracene laborer, a chemical factory laborer, a gas works laborer, a pitch bed breaker, a barge loader, and a road sprayer. He further adds that tar cancer, as far as present knowledge goes, is not preventable but should not kill.

Fur sewers, fur dyers, and fur dealers, particularly young workers, are subject to skin eruptions.

At the close of the paper the question of treatment was discussed.—R. P. White.

BACTERIOLOGIC STUDY OF CUTTING OILS CAUSING SKIN LESIONS. *R. C. Rosenberger.* Abstracted as follows from New York Med.

Jour. and Med. Rec., Oct. 4, 1922, 116, No. 7, 377, in Jour. Am. Med. Assn., Nov. 4, 1922, 79, No. 19, 1639.—It is a very common thing to observe in those workers in or with oil a condition, either of an acne, a dermatitis or furunculosis. Various factors have been put forward as the causative agent in these conditions. Some have mentioned the irritating properties of the higher paraffin, others have mentioned the presence of the particles of metals, while all mention the personal cleanliness of the workers. Rosenberger asserts that the presence of staphylococci or streptococci in fresh or used oil is exceedingly rare, and, therefore, the alleged presence of these organisms in freshly made oils should not be accepted as the whole cause of the conditions cited. The addition of antiseptics or germicides to the cutting oils appears to exercise very little, if any, action on pyogenic bacteria in pus, nor is it effective in the prevention of infections of the skin.

Dermatitis from Substitutes for Turpentine. *Galewsky*. Abstracted as follows from Dermat. Wchnschr., March 25, 1922, 74, 273, in Arch. Dermat. and Syph., Nov., 1922, 6, No. 5, 638.—Four cases of occupational dermatitis in painters due to the use of substitute products for turpentine are reported. There were no unusual features in the eruptions.

Eye Affections in Motion Picture Actors. Jour. Am. Med. Assn., Nov. 4, 1922, 79, No. 19, 1623.—Professor Adam of Berlin spoke recently at the ophthalmologic congress in Jena on eye affections in motion picture actors. The observed disturbances consisted of inflammatory manifestations, reddening and swelling of the lids and a more or less marked sensitiveness of the eye. Adam ascribes these disturbances to an affection of the conjunctiva. The characteristic feature of motion picture conjunctivitis is that, in addition to the inflammation, small granular nodules appear. This gives rise to the assumption that this complication is due not only to the intense light radiation, but also to the effect of the dust on the conjunctiva.—K. R. Drinker.

Eyestrain in Industrial Occupations. *Nelson M. Black*. Nation's Health, Nov. 15, 1922, 4, No. 11, 682-684.—The author discusses the causes of defective vision and of eyestrain, and emphasizes the general impairment of efficiency which results from substandard vision. He goes on to discuss the importance of examining the eyes of all applicants for employment in order that visual defects may be discovered and corrected—a measure which protects the employer in case of accident, and which improves the health and efficiency of the workers.—K. R. Drinker.

Difficult Cases of Coal-Miners' Nystagmus. *T. Lister Llewellyn*. Trans. Ophth. Soc., 1922, 42, 315-319.—Accurate diagnosis of nystagmus among miners is important since the disease entitles one to compensation. Symptoms may be predominantly either atonic, spastic, or psychic. Diagnosis is easy only for atonic cases which are distinguished by manifest rotatory oscillation of the eyeballs. Diagnosis of the disease should not be made from the history given by the patient unless there is confirmation by physical examination. Rotatory oscillation of the eyes; true lid-spasm associated with photophobia; head tremor with backward inclination and resistance of the head, combined with objective giddiness, may separately be considered sufficient to confirm the diagnosis when accompanied by a typical history. Irregular movements of the eyes, rolling about of the eyes, blinking, may all be purposive. Miners may develop psychoneuroses quite apart from their underground life, and may refer their symptoms to the oculomotor apparatus. Pit work may not be the cause of incapacity. Objective signs of the disease must be present before a certificate of incapacity is given; otherwise a surgeon will only confirm the man in a neurosis and do him unintentional injury.—E. L. Collis.

Battery Burns: Report of Three Cases. *Harry S. Gradle*. Jour. Am. Med. Assn., Nov. 25, 1922, 79, No. 22, 1819-1821.—The author reports three cases of burns of the eye and adnexa by sulphuric acid from storage batteries. All of the patients were mechanics working on the storage batteries of automobiles. The accidents resulted from the ignition, by an electric spark in one case, and by

a blow-torch in two cases, of a mixture of hydrogen and air in the small air chamber that lies within the battery cell between the upper level of the sulphuric acid and the cover of the cell. The explosions resulted in the splashing of hot acid into the eyes of the patients.

The author advises the use of protective goggles by every mechanic who works with charging batteries, and outlines the first-aid treatment to be given in case of an accident of the type reported.—K. R. Drinker.

INDUSTRIAL SURGERY

AN EMERGENCY UNIVERSAL SPLINT FOR FRACTURED LONG BONES. *H. C. Masland.* Jour. Am. Med. Assn., Nov. 25, 1922, 79, No. 22, 1839.—The author describes with illustrations an emergency splint for use in factories, mines, patrol wagons, etc., to give comfort during the delay that occurs while a patient is being transported to a hospital for corrective treatment.—K. R. Drinker.

INDUSTRIAL PHYSIOLOGY: NUTRITION, METABOLISM, FATIGUE, ETC.

A TEACHING DEVICE FOR FATIGUE ELIMINATION. *Frank B. Gilbreth.* Nation's Health, Nov. 15, 1922, 4, No. 11, 672-673.—By means of a device called the "Magster", which is an inexpensive stereoscopic viewer of magazine rolls of moving picture photographs on paper of time and motions, it is now possible to present to the apprentices and workers of the world, the chance to see the methods of the best workers available, in their chosen life work. This is a step toward automaticity in method of the best way to do a given piece of work.—L. A. Shaw.

GREAT BRITAIN'S PLACE IN FATIGUE ELIMINATION. *Henry J. Spooner.* Nation's Health, Nov. 15, 1922, 4, No. 11, 673-676.—The first steps in the direction of a systematic study of industrial fatigue in Great Britain were taken in 1913 by the Home Office. With the outbreak of the war there came into existence the Health of Munition Workers' Committee under the Minister of Munitions. This committee was disbanded at the end of 1917 and its place taken by the Medical Research Committee and the Department of Scientific and Industrial Research. With the institution of drastic governmental economies in 1920 to 1921 the Industrial Fatigue Research Board was compelled to carry on its investigations on a more restricted scale than previously. Mention is made of the personnel of the various foregoing government agencies and of the subjects investigated and papers published.—L. A. Shaw.

THE RELATION BETWEEN FATIGUE AND THE SUSCEPTIBILITY OF GUINEA PIGS TO INFECTIONS OF TYPE 1 PNEUMOCOCCUS. *Edith R. Nicholls* and *Reynold A. Spaeth.* Am. Jour. Hyg., Sept., 1922, 2, No. 5, 527-535.—It has been a quite commonly accepted belief that fatigue tends to increase susceptibility of individuals to disease. Evidence to prove this has not always been convincing, however, and experimental evidence in particular has been meager. Fatigue artificially induced in white rats and hooded rats has been shown definitely to increase rather than decrease their resistance to intraperitoneal injections of Type 1 pneumococcus. This paper gives the results of experiments showing that the same is true of guinea-pigs.

Throughout the experiments great care was exercised. The pigs, obtained from dealers, were held ten days or two weeks until they showed by their weight curves satisfactory adaptation to the new environment. They were then forced to run in motor-driven drums until exhausted, as shown by their failure to respond to ordinary exciting stimuli, such as pounding on the table or gentle handling. Every animal was subjected to three such running periods and injections of pneumococci were made in some cases before and in others after running. It was found in preliminary experiments that albino pigs were 300 per cent. more susceptible to such injections than pigmented pigs, and this relation was kept in mind during the main problem. The culture was carefully prepared.

Systematic autopsies were made, cases indicating secondary infections were rejected, and tabulated results included only deaths due without question to pneumococcal infections.

It was found that 80 per cent. of unfatigued animals died as the result of pneumococcal injections. On the other hand, 80 per cent. of animals fatigued as above and then subjected to injection lived. When the injection took place prior to fatigue 56 per cent. lived. These results corroborate the previous work on the relation between fatigue and susceptibility to Type 1 pneumococcus in white and hooded rats. Several charts and tables present the results in detail.—G. N. Thompson.

INDUSTRIAL MEDICAL SERVICE: MEDICAL DISPENSARIES AND HOSPITALS IN INDUSTRIAL PLANTS

THE FUNCTIONS OF MEDICINE IN INDUSTRY. *John A. Lapp.* Nation's Health, Nov. 15, 1922, 4, No. 11, 680-681.—Under the modern industrial regime the working environment must be adjusted to the workers, and the workers themselves, so far as possible, must be adjusted to their employment. These are the ends toward which industrial physicians must work, not alone, however, but as one department co-operating with the service department, the employment department, the department of social welfare, etc. Industrial medicine must be careful to establish itself on neutral ground by taking neither side and by establishing close communication with the human material with which it deals.—L. A. Shaw.

INDUSTRIAL MORBIDITY AND ACCIDENT RECORDS. Nation's Health, Nov. 15, 1922, 4, No. 11, 678-679.—The fact that there is as yet no comprehensive and co-ordinated effort in record keeping in the medical departments of most otherwise progressive firms, led the Committee on Standardization of Records for Medical Service in Industry to formulate a logical grouping of the different items which must be considered in an intelligent analysis of morbidity and accident data. The items herein mentioned serve as a minimum amount of information to which more can be added at the discretion of individual plants. The proper grouping of these data is also shown in record form.—L. A. Shaw.

DENTAL SERVICE FOR EMPLOYEES. *Otto U. King.* Hosp. Management, Nov., 1922, 14, No. 5, 73-74.—Eight hundred million working days each year are lost to industry through ill health. A great deal of this is due to decayed teeth and diseased gums, which handicap men in converting food-energy into man-power and lead to a long list of diseases. Preventive dentistry is necessary to stop this vast amount of economic waste and physical suffering. So far it has had practical application through six different methods.

The first of these involves providing dispensaries for the children of employees, each having a corps of dentists and nurses who render treatment to children of less than 14 years, and carry a campaign of education into the home.

The second provides free treatment for all employees. Besides relieving pain, this also prevents much loss of time on the part of employees and furnishes an opportunity for teaching the proper care of the teeth.

A third variety is the furnishing of treatment through the co-operation of mutual aid associations and the employers, the expense being shared.

The fourth plan provides for dental treatment at cost, such treatment being rendered on the company's time and supplemented by educational literature.

The fifth involves the establishment of a co-operative self-paying clinic, organized by and for the employees, the object being to secure for themselves strictly high-grade work at a moderate price.

The sixth is the plan of Dr. Henry L. Banzhaf of Milwaukee, Wis., who has organized a co-operative dental clinic known as the Milwaukee Industrial Dental Clinic. It is the outcome of unsatisfactory attempts by large industrial concerns to have dental work done in their own establishments. Aside from educational work, its main feature is the maintenance of a large, centrally located dental office which sends out dentists at cer-

tain hours to each factory. There the employees needing attention are relieved of pain, given examination, and provided with mouth charts which serve as a guide either for their own dentist or the central office; at the latter place, through reduction in overhead expenses and specialization, a low fee for high-grade work is possible. Dr. Banzhaf says that this plan is the most feasible one for furnishing really high-grade work to the working man and his family.—G. N. Thompson.

INDUSTRIAL PSYCHOLOGY AND INDUSTRIAL MANAGEMENT IN ITS HEALTH RELATIONS

The Psychology of Employment. *C. O. Weber.* Abstracted from Administration, June, 1922, in Jour. Personnel Res., Sept., 1922, 1, No. 5, 270.—The author speaks of the great cost to any company of labor turnover, and of recruiting labor. This cost, he says, can be avoided by the use of correct employment principles. While physical tests and the personal interview are good methods of selecting employees, they do not measure capacities such as speed of visual perception, keenness of touch, auditory discrimination, etc. These capacities can only be determined by psychological tests.

The test must be devised for each type of worker to be hired. The procedure used is as follows:

1. A group of workers is selected and observed for a period of time as to output, errors, weaknesses, and strength.

2. The group is subjected to a series of mental and motor tests which it is believed will best determine the ability of each worker.

3. The coefficient of correlation between the actual practical ability of each worker and his test ability is determined.

If the coefficient of correlation is high, the test may be used to select applicants. With such a test the company eliminates applicants who will not make good.

Such tests have been used by some companies. They are not easy to devise, but once devised they are simple to handle. Their advantage lies in the fact that they indicate the presence or absence of capacities which otherwise would not be indicated for some time, and also that in a short while a great number of applicants can be examined.

INDUSTRIAL HEALTH LEGISLATION: COURT DECISIONS: WORKMEN'S COMPENSATION AND INSURANCE

Court Decisions on Workmen's Compensation Law July, 1920-October, 1922. New York State Dept. Labor, Special Bull. No. 114, Dec., 1922, pp. 188.—Among the phases of the workmen's compensation law covered in this report are the following:

Treatment and care of injured employees.
Disability compensation.
Death benefits and dependency.
Waiting period.
Wages as the basis of compensation.
Payment of compensation—agreements, lump sums, etc.
Self-insurance.
Private insurance contracts.
Filing of compensation claims.
Election of remedies.
Subrogation of carrier in third party cases.
Notice of accident by employee to employer.
Presumption in favor of compensation claims.
Board's power to rescind or revise its awards and decisions.

SUBJECT INDEX TO VOLUME IV

This is a subject index to all the reading matter in the ABSTRACT OF THE LITERATURE OF INDUSTRIAL HYGIENE, and one should, therefore, look for the subject word. The name of the author follows the subject entry in parentheses.

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